Mines and Mineral Activities 1988

Canada

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Introduction

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This report covers mines and mineral activities for the Yukon and Northwest Territories for the calendar year 1988.

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Summary

Yukon

The value of mineral commodities produced in Yukon in 1988 was estimated at $645.9 million compared with $474 million in 1987. Most of the production value was derived from four hard-rock mines and 234 seasonal placer gold operations. The largest mine in Yukon, Curragh Resource's Faro zinc-lead-silver operation, produced a record 515 000 t of zinc and lead concentrate, well above last year's output. The strengthening of zinc and lead prices made 1988 a remarkably good year.

Gold prices followed a downward trend in 1988. However, placer gold production surpassed the previous record set in 1917. Approximately 4 078 kg of fine gold were presented for royalty payment in 1988, compared with 3 300 kg in the previous year. The placer industry accounted for 84 per cent of the Yukon's gold production. In March 1988, the Ketza River gold mine started milling and, in August 1988, the Mount Skukum mine closed because of dwindling ore grades.

Silver prices also fell during the year, but production was double that of the previous year because of higher output from both the Faro mine and United Keno Hill mines. In November, it was evident that low silver prices were crippling the United Keno Hill operation.

Gold, followed by base metals, silver and platinum group metals, were the driving force behind mineral exploration and development activity. At year's end, Curragh Resources was proceeding with development for production from its Vangorda Plateau deposits (GRUM, VANGORDA, DY) in the 1990's. Omni Resources and Skukum Gold Inc. were also proceeding toward production with development on their Skukum Creek gold-silver property. B.Y.G. Natural Resources and Chevron Minerals were moving toward a production decision on their Mount Nansen gold-silver property.

Yukon's four hard-rock mines employed 845 persons directly in 1988. In addition, Yukon's placer mining industry employed an estimated 650 seasonal workers.

Yukon accounted for 45.7 per cent of the lead, 26.4 per cent of the zinc, 17.6 per cent of the silver and 3.8 per cent of the gold produced in Canada during 1988. Yukon's metallic mineral production amounted to 4.6 per cent of the value of the Canadian total in 1988, compared with four per cent in 1987.

Northwest Territories

In 1988, minerals in the Northwest Territories were produced principally from seven hard-rock mines: four gold mines and three zinc-lead-(silver) mines. The largest operation in the N.W.T., the Pine Point mine, processed its last ore on April 6, 1988. At its production peak, the mine employed over 650 workers and accounted for close to 16 per cent of the N.W.T.'s total value of mineral production. In April, Treminco Resources brought the small Ptarmigan Mine, a former gold producer, back into production.

The value of mineral production in the N.W.T was estimated at $766 million in 1988, compared with $713 million a year earlier. Much of the increase was due to higher zinc production and a steady rise in zinc prices. With the closing of mill production at the Pine Point, lead output was reduced appreciably. Gold production value followed the downward trend of gold prices in 1988. Together, zinc and lead production accounted for 71 per cent of the total value of mineral shipments, while gold production accounted for 26 per cent.

During 1988, the most important mining development was the commissioning of the $25-million Giant Yellowknife Mines tailings re-treatment plant. It is designed to process 7 300 t of tailings per day and to recover about half of the 2.3 g of gold per t contained in the Giant Mine tailings. Neptune Resources Corp. proceeded with construction of its 9 000 t per day mill and open-pit mine project on its COLOMAC property, north of Indin Lake. Total construction and pre-production costs will exceed $150 million. In November, Treminco Resources Ltd. started work on a new head frame for the Ptarmigan mine shaft. Also, Noranda Inc. and Total Energold Corporation started a two-year, $35-million underground exploration program on the TUNDRA (FAT) property in the Courageous Lake area.

The mineral industry in the N.W.T. accounted for 23.1 per cent of the zinc, 20.2 per cent of the lead, 8.9 per cent of the gold and 1.8 per cent of the silver produced in Canada in 1988. The value of these metals, combined with by-products bismuth and cadmium, accounted for 5.5 per cent of Canada's metallic mineral production in 1988, compared with 6.4 per cent in 1987.

Operating mines in the N.W.T. directly employed 1,848 persons in 1988, compared with 2,110 in 1987.

Sommaire

Yukon

En 1988, la production minière du Yukon a été évaluée à 645,9 millions de dollars, comparativement à 474 millions en 1987. La majeure partie provenait de quatre mines en roche dure et de 234 sites d'exploitation saisonnière de placers. La mine la plus importante du Territoire, la mine de zinc, plomb et argent de la Curragh Resources de Faro, a réalisé une production record de 515 000 t de concentré de zinc et de plomb, soit une nette augmentation par rapport à l'année précédente. Il s'agit donc d'une année particulièrement bonne car les prix du zinc et du plomb se sont consolidés au cours de l'année.

Les prix de l'or ont par ailleurs suivi une courbe descendante. Toutefois, la production d'or provenant des placers a dépassé le record antérieur établi en 1917. En 1988, la quantité de ce métal déclarée aux fins de redevances a atteint environ 4 078 kg d'or fin, comparativement à 3 300 kg l'année précédente. La production de l'industrie des placers a représenté 84 p. 100 de la production d'or du Territoire. En mars 1988, la mine d'or de la rivière Ketza a commencé à traiter son minerai, mais, en août, la mine du mont Skukum a fermé ses portes en raison d'une baisse de la teneur du minerai.

Les prix de l'argent ont aussi faibli au cours de l'année, mais la production de ce métal a été le double de celle de l'année précédente en raison du rendement plus élevé de la mine Faro et des mines de la United Keno Hill. En novembre, il était évident que les prix peu élevés de l'argent portaient atteinte aux activités de la United Keno Hill.

L'or a constitué l'élément moteur des activités minières d'exploration et de mise en valeur, suivi par les métaux communs, l'argent et le platine. À la fin de l'année, la Curragh Resources a procédé à l'aménagement de ses gisements du plateau Vangorda (GRUM, VANGORDA, DY) en vue de leur mise en exploitation dans les années 1990. La Omni Resources et la Skukum Gold Inc. ont également préparé la mise en exploitation de leur propriété aurifère et argentifère de Skukum Creek par des travaux d'aménagement. Les sociétés B.Y.G. Natural Resources et Chevron Minerals étaient sur le point de prendre une décision concernant l'exploitation de leur propriété aurifère et argentifère du mont Nansen.

Les quatre mines en roche dure du Yukon ont procuré des emplois directs à 845 personnes en 1989, et on estime que les exploitations de placers du Territoire ont fourni de l'emploi saisonnier à 650 personnes.

En 1988, les mines du Yukon ont produit 45,7 p. 100 du plomb, 26,4 p. 100 du zinc, 17,6 p. 100 de l'argent et 3,8 p. 100 de l'or extraits au Canada. Les minéraux métalliques produits équivalaient à 4,6 p. 100 de la production canadienne en 1988, comparativement à 4 p. 100 en 1987.

Territoires du Nord-Ouest

En 1988, la production minière des Territoires du Nord-Ouest provenait principalement de sept mines en roche dure, dont quatre d'or et trois de zinc, plomb (et argent). La mine la plus importante des T. N.-O., la mine Pine Point, a traité son dernier stock de minerai le 6 avril 1988. Au moment de sa production maximale, elle employait 650 travailleurs, et sa production représentait près de 16 p. 100 de celle des T. N.-O. En avril, la Treminco Resources a remis en activité la petite mine d'or Ptarmigan, déjà exploitée auparavant.

On a évalué à 766 millions de dollars la valeur de la production minière dans les T. N.-O. en 1988, comparativement à 713 millions l'année précédente. Une bonne partie de l'augmentation résultait de la production plus importante de zinc et de la montée régulière des prix du zinc au cours de l'année. L'arrêt de la production à la mine Pine Point dans la première moitié de l'année a entraîné une réduction sensible de la production de plomb. La production d'or a suivi la tendance à la baisse des prix de ce métal en 1988. La production combinée de zinc et de plomb a représenté 71 p. 100 des expéditions totales de minéraux alors que la production d'or correspondait à 26 p. 100.

L'événement le plus important, en 1988, dans le domaine de l'exploitation minière a été la décision de construire l'usine de retraitement des résidus des mines Giant Yellowknife, au coût de 25 millions de dollars. L'usine est conçue pour traiter 7 300 t de résidus par jour et recouvrer environ la moitié des 2,3 g d'or par tonne contenus dans ceux-ci. La Neptune Resources Corp. a construit une usine d'une capacité de 9 000 t par jour et entrepris un projet de mine à ciel ouvert sur sa propriété COLOMAC, au nord du lac Indian. Les dépenses totales pour la construction et les travaux préliminaires dépasseront 150 millions de dollars. En novembre, la Treminco Resources Ltd. a entrepris la construction d'une nouvelle structure de tête de puits à sa mine Ptarmigan. La Noranda Inc. et la Total Energold Corporation ont amorcé un programme d'exploration souterraine de deux ans, qui coûtera 35 millions de dollars, sur leur propriété TUNDRA (FAT), dans la région du lac Courageous.

Les mines des T. N.-O. ont extrait 23,1 p. 100 du zinc, 20,2 p. 100 du plomb, 8,9 p. 100 de l'or et 1,8 p. 100 de l'argent produits au Canada en 1988. La valeur de ces métaux, à laquelle il faut ajouter celle des dérivés que constituent le bismuth et le cadmium, représentait 5,5 p. 100 de la production canadienne de minéraux métalliques, comparativement à 6,4 p. 100 en 1987.

Les mines en exploitation dans les T. N.-O. ont procuré des emplois directs à 1 848 personnes en 1988, comparativement à 2 110 en 1987.

Mines and Mineral Activities

Yukon

Mineral Production

The value of mineral commodities produced in Yukon in 1988 was estimated at $645.9 million compared with $474 million in 1987. Most of the production value was derived from four hard-rock mines and 234 seasonal placer gold operations. The largest operation in the territory, Curragh Resource's Faro zinc-lead-silver mine produced, a record 515 000 t of zinc and lead concentrate, well above last year's output. The strengthening of zinc and lead prices made 1988 a remarkably good year.

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Silver prices also fell during the year, but silver production was double that of the previous year because of higher output from both the Faro mine and United Keno Hill mines. In November, it was evident that low silver prices were crippling the United Keno Hill operation.

Gold, followed by base metals, silver and platinum group metals, were the driving force behind mineral exploration and development activity. At year's end, Curragh Resources was proceeding with development for production from its Vangorda Plateau deposits (GRUM, VANGORDA, DY) in the 1990s. Omni Resources and Skukum Gold Inc. were also proceeding toward production, with development on their Skukum Creek gold-silver property. B.Y.G. Natural Resources and Chevron Minerals were moving toward a production decision on their Mount Nansen gold-silver property.

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Mines

Canamax Resources Inc. and Pacific Trans-Ocean Resources Ltd., Ketza River Mine

The Ketza River mine (c)*, the Yukon's newest mine, started in early March and poured its first gold-silver bar in late April. By year's end, mill throughput was 86 664 t of ore and 635.3 kg of gold and 6.8 kg of silver were produced. The ore mined and processed during the year was from the oxide reserves of the Peel and Ridge zones. The oxide reserves from these zones and the Break zone were recalculated in November using a lower specific gravity value, resulting in lower estimates of oxide ore reserves than previously thought. Oxide reserves at year end were sufficient for two years of production life. However, sulphide reserves could extend the mine's life into the 1990s.

Type:	underground
Location:	60 km south of Ross River
Product:	gold
Mill Capacity:	320 tpd
Tonnes Milled:	86 664 t
Oxide Reserves:	230 000 – 250 000 t (December 31, 1988)
Oxide Reserve Grade:	12.0 – 13.1 g/t gold
Sulphide Reserves:	480 000 t (December 31, 1988)
Sulphide Reserve Grade:	10.7 g/t gold
Employees:	105

Table 1:
Mineral Production of Operating Mines in the Yukon, 1986, 1987, 1988 and Employment, 1988

Company, Mine and Commodity	1986 t	1986 kg	1987 t	1987 kg	1988(P) t	1988(P) kg	Number of Employees (1)
Canamax Resources Inc.							
gold	------	------	------	------	------	635.3	105
silver	------	------	------	------	------	6.8	
Curragh Resources Corp.							
Faro Mine							
zinc	62 951	------	184 727	------	200 927	------	450
lead	38 204	------	121 539	------	149 354	------	
silver	------	42 753	------	109 202	------	214 051	
Dawson Eldorado Mines Ltd.							
Plata-Inca							
silver	------	1 244	------	857	------	------	nil
lead	N/A	------	N/A	------	------	------	
Nadahini Mining Corporation							
Whiskey Lake							
coal	17 233	------	20 000	------	10 000	------	
Total Erickson Resources Ltd.							
Mount Skukum							
gold	------	933	------	1 379	------	168.5	90
silver	------	715	------	1 068	------	N/A	
United Keno Hill Mines Ltd.							
Elsa area mines							
silver	------	53 187	------	46 437	------	54 181	200
lead	1 355	------	1 605	------	2 818	------	
zinc	66	------	385	------	300	------	
Whitehorse Coal Corporation							
coal	1 800	------	------	------	2 721	------	
TOTAL							845

Source:
Department of Indian Affairs and Northern Development. These figures are those reported by the mines as production and will not match Statistics Canada's production figures which are based on metals sold or shipped.

N/A = Not available
(P) = Preliminary
-- = nil
(1) = number of employees at year end 1988

Curragh Resources Inc., Faro Mine

In 1988, the Faro Mine (b) processed 4 126 000 t of ore to recover 200 927 t of zinc, 149 354 t of lead and 214 051 kg of silver. This output was contained in 315 000 t of zinc concentrate and 200 000 t of lead concentrate. Mine production was suspended from June 10 – July 7 because of a mine workers' strike.

In 1991, the Faro open-pit mine will switch to an underground operation because the open-pit reserves will be depleted. Underground reserves could extend the life of the Faro Mine to 1993.

Work during 1988 continued on the haulage road from the Faro mill to the Vangorda Plateau zinc-lead-silver deposits (GRUM, VANGORDA, DY). Overburden stripping of the Vangorda and Grum open-pit areas (35) was conducted. Production from the Vangorda deposit is scheduled to begin in 1992. The Grum deposit is scheduled to begin production in 1993. The DY deposit could be brought into production as early as 1995.

Type:	open-pit
Location:	13 km north of Faro
Product:	zinc, lead, silver
Mill Capacity:	13 500 tpd
Tonnes Milled:	4 126 000 t
Reserves:	15 million t (December 31, 1987)
Reserve Grade:	3.37% lead, 4.69% zinc, 45 g/t silver
Employees:	450

Geological Resources and Reserves of Vangorda Plateau Deposits

Mineral Deposit	Millions of tonnes	% Zinc	% Lead	g/t Silver	g/t Gold
GRUM	30.6 (24 million t by open-pit)	5.8	3.4	57	1.0
VANGORDA	7.5 (six million t by open-pit)	4.9	3.8	54	0.8
DY	21.0	6.7	5.5	84	1.0

* Numbers or letters in parenthesis indicate the location of the property on the map near the centrefold.

Total Energold Corporation and AGIP Resources Ltd., Mount Skukum Mine

Total Energold Corporation owns 37 per cent of the Mount Skukum gold mine (d). Total Resources (Canada) Ltd., the parent of Total Energold merged with Getty Resources in January 1988; several months later Getty Resources and Total Erickson Resources merged, to bring the operation of the mine under the aegis of Total Energold. The mine is operated with the joint venture partner, AGIP Resources Ltd.

In the first half of 1988, the Mount Skukum mill processed 27 993 t of ore, with an average grade of 6.59 g of gold per t, to produce 168.5 kg of gold. This production compares with 97 011 t of ore grading 15.4 g of gold per t and production of 1 378.5 kg of gold in 1987. On June 21,1988 the Mount Skukum mill shut down. On August 2, 1988 the joint venture partners announced an indefinite suspension of production because of inconsistent mill feed. Underground development during the year was unable to confirm previously estimated drill-indicated reserves in the Lake zone. All ore supplied to the mill was supplied from the Cirque and Lake zones. The mill throughput in June had dropped to 90 t per day.

Almost 4 000 m of underground drilling and 1 164 m of development headings were completed during the year.

Type:	underground
Location:	90 km southwest of Whitehorse
Product:	gold
Mill Capacity:	273 tpd
Tonnes Milled:	27 933 t
Reserves:	36 000 t (December 31, 1988)
Reserve Grade:	13.7 g/t
Employees:	90 (June 1, 1988)

United Keno Hill Mines Limited, Elsa Area Mines

The company milled 91 897 t of ore at its Elsa mill compared with 78 834 t a year earlier. Production was derived mainly from six underground operations (the Husky, Husky SW, Elsa, No Cash, Silver King and Bellekeno mines), and one open-pit mine, the Onek (a).

Mill production in 1988 amounted to 54 818.4 kg of silver and 2 818 t of lead, all contained in concentrate. This compares with 46 436.8 kg of silver and 1 430 t of lead produced a year earlier.

The mine employed approximately 200 persons during most of the year. In November 1988, the company reduced the scope of its operations and work force because of low silver prices, a shortage of skilled miners and high operating costs. By January 1989, silver prices had fallen below U.S. $6.00 per ounce. As a result, the company suspended production on January 6, 1989 and laid off 177 employees. The mine and mill will be maintained until silver prices have improved sufficiently to re-open the operation.

Type:	underground and open-pit
Location:	Keno Hill-Galena Hill area, near Elsa
Product:	silver, lead
Mill Capacity:	450 tpd
Tonnes Milled:	91 897 t
Reserves:	292 054 t (December 31, 1988)
Reserve Grade:	960 g/t silver, 4.6 % lead
Employees:	177 (December 31, 1988) 27 (January 31, 1989)

Small Seasonal Mine Operations

Nadahini Mining Corporation

The company operated the open-pit Whiskey Lake coal mine (e) located west of Ross River, under an agreement with Curragh Resources Inc. Coal production feeds the concentrator drier at the Faro mill. Nadihini mined approximately 10 000 t of bituminous coal in 1988 and drilled over 15 240 m to prove reserves for the 1989 mining season.

Whitehorse Coal Mining Corporation

The company mined approximately 2 721 t of coal from the Whitehorse (Mount Granger) property (f).

Anooraq Resources Ltd., Evelyn Creek Rhodonite Mine

The company mined rhodonite, from the Marlin property near Evelyn Creek (21). The mineral is a manganese silicate mineral, which is used as a decorative stone. In 1988, a 22-km access road was completed to the property. Total sales of rough rhodonite for the year amounted to $212 000.

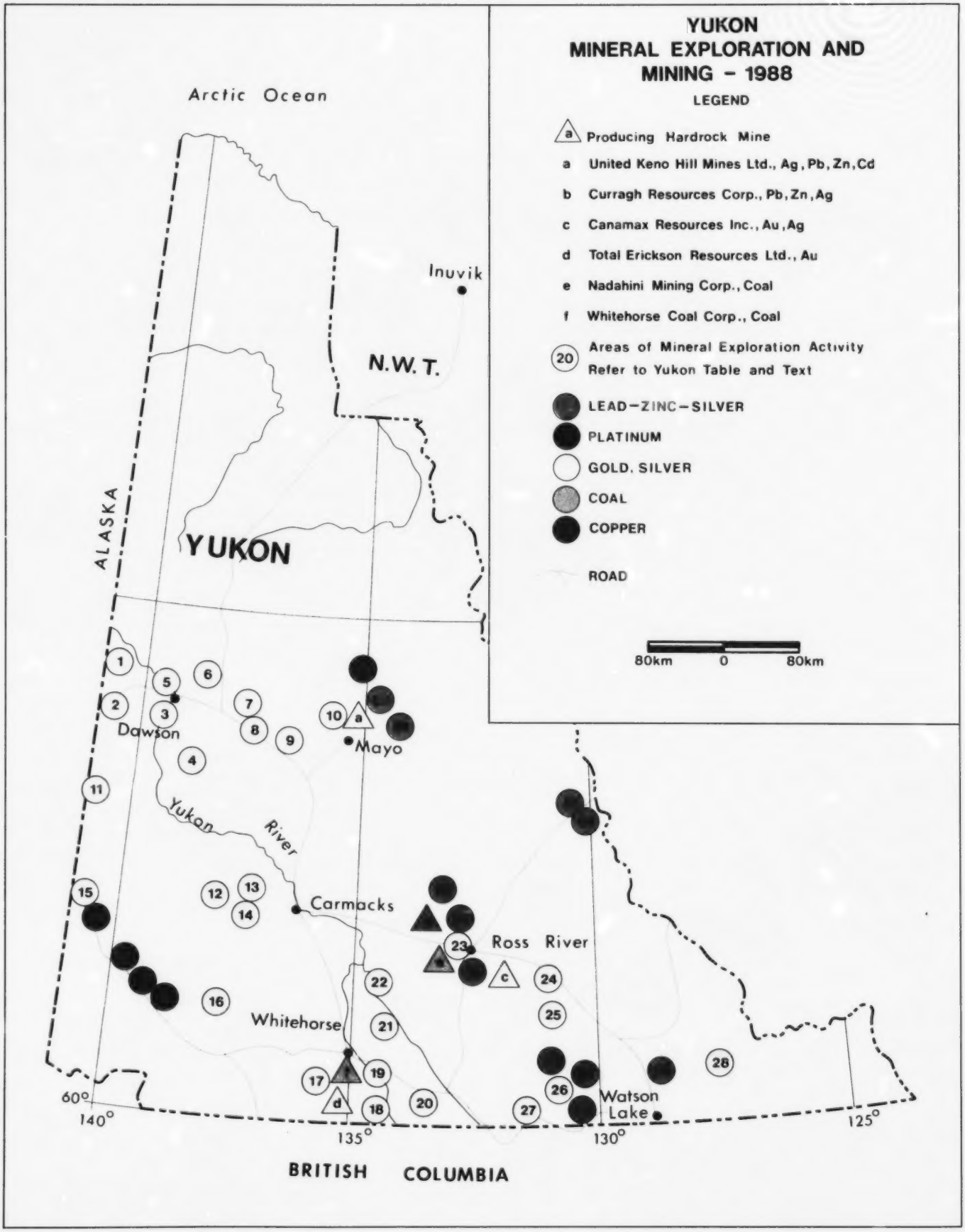
Placer Mining

Yukon's placer mining industry reported 5 098.4 kg of crude gold, or approximately 4 079 kg of fine gold for royalty payments. Gold production was valued at $70.7 million and represented 84 per cent of Yukon's gold production. Placer gold production surpassed the previous record set in 1917, and compares with 4 136 kg of raw gold or approximately 3 300 kg of fine gold reported in 1987.

There were 234 active operations during the year employing a seasonal work force of approximately 650 people. The traditional placer mining areas continued to provide the bulk of the gold output. These include the Klondike (3), Indian (3), Sixtymile (2) and Lower Stewart River (4) drainage areas.

Gold City Resources, with three active open-pits, was one of the major producers in the Indian River area (3). Queenstake Resources Ltd. produced 146.2 kg of fine gold from its Black Hills Creek and Maisy Mae Creek (4) operations. Rise Resources Ltd. (3) reported that production during September 1988 averaged more than 2 633 kg (75 oz) of sluice-run fine gold per 22-hour shift. Grandex Resources reported production to June 15, 1988, of 25.5 kg of raw gold (900 oz) from its Swede Creek (10) property near Mayo.

Granges Exploration Ltd. mined its Lee property (2) at Sixtymile Creek. The company expected to produce between 56 kg and 85 kg of gold during the placer mining season. Klondike Gold Mining Corp. resumed winter underground mining of the frozen gold-bearing sand at Miller Creek in November 1987.


YUKON
MINERAL EXPLORATION AND
MINING – 1988
LEGEND
a Producing Hardrock Mine
a United Keno Hill Mines Ltd., Ag, Pb, Zn, Cd
b Curragh Resources Corp., Pb, Zn, Ag
c Canamax Resources Inc., Au, Ag
d Total Erickson Resources Ltd., Au
e Nadahini Mining Corp., Coal
f Whitehorse Coal Corp., Coal
20 Areas of Mineral Exploration Activity
Refer to Yukon Table and Text
LEAD–ZINC–SILVER
PLATINUM
GOLD, SILVER
COAL
COPPER
ROAD
80km 0 80km
Arctic Ocean
Inuvik
N.W.T.
ALASKA
YUKON
Dawson
Mayo
Yukon River
Carmacks
Ross River
Whitehorse
Watson Lake
60°
140°
135°
130°
125°
BRITISH COLUMBIA

Development

The closing of the Mount Skukum gold mine in August 1988 and the United Keno Hill Mines silver operation early in January 1989 was a setback for the territorial mining economy. At year end, Omni Resources Inc. and Skukum Gold Inc. were progressing toward initial production at the Skukum Creek gold-silver property (d), in the Wheaton River valley. Some 3 200 t mined and processed from the Rainbow zone showed good gold and silver recoveries using a cyanide flotation process. In November 1988, the joint venture was in the process of aquiring a mill and water licence for mill processing. The companies plan to begin production in 1989.

Curragh Resources was developing the Grum and Vangorda (35) zinc-lead-silver deposits for initial production in the early 1990s. In 1988, the overburden over the Grum open-pit area was being stripped and a road was being constructed to link the Vangorda Plateau area to the Faro mill. Capital spending over 1989-1993 to bring new ore reserves into production, is expected to amount to as much as $200 million.

Mineral Exploration

Exploration expenditures in Yukon were estimated at $50 million in 1988 compared with $43 million in 1987. Exploration activities were directed principally to precious metals, including platinum group metals and, to a lesser extent, zinc-lead-silver deposits. More than 30 drill programs were reported, 10 on properties with significant proven reserves.

Table 2
Quartz Claims Recorded in Yukon in 1987 and 1988

Mining District	1987	1988
Whitehorse	6 002	3 885
Dawson	2 464	2 553
Mayo	558	877
Watson Lake	3 554	2 975
Total	12 568	10 290

Exploration Projects

Whitehorse Area

Skukum Gold Inc. and Berglynn Resources Inc. reported good gold intersections in holes drilled on the GODDELL claims (d). Of four holes completed, totalling 2 000 m, two holes intersected gold. The best intersection was 20.9 g of gold per t over 11.3 m and 13.4 g of gold per t over 6.4 m.

Adastral Resources Ltd. reported two new silver-gold-bearing veins on the AUL property (d) near Bennett Lake.

New Era Developments Ltd. drilled 23 holes totalling 1 524 m on its Red Ridge property (17), to test the Saddle and Miller zones. Gold and silver values were intersected in several drill holes over narrow widths.

On the CHARLESTON claims (d), Total Energold Corp. trenched and sampled the Charleston vein. A number of mineralized shoots along the length of the vein contained high gold and silver values.

At Marsh Lake, B. Cofer excavated gold-and silver-bearing quartz stringers on the ROSS BANK property (19).

Dunvegan Exploration Ltd. conducted trenching on the JUBE property (20) and exposed a gold showing in a quartz vein.

Omni Resources Inc. and Skukum Gold Inc. continued the exploration and development of the Skukum Creek (d) mine project. Over 6 000 m of diamond drilling was completed. Development included, driving of a new entry, extension of drifts in the Rainbow and Kuhn zones and the driving of a decline in the footwall of the Rainbow zone. Test mining of 3 200 t of ore was conducted to provide a bulk sample. Drill-proven reserves amounted to 747 110 t grading 7.71 g of gold per t and 307.2 g of silver per t. Additional indicated reserves amount to 119 210 t grading 8.95 g of gold per t and 169.7 g of silver per t.

In preparation for production in 1989, Skukum Gold Inc. leased the 273 tpd mill at the inactive Mount Skukum gold mine. However, early in 1989 the Yukon Territory Water Board refused to assign the existing water use licence for the Mount Skukum mill to the new Skukum Creek mine project.

Dawson Range

On the MOUNT NANSEN property (14), BYG Natural Resources Inc., in a joint venture with Chevron Minerals Ltd., concentrated on bringing the Brown-McDade reserves into the drill proven category and defining the open-pit reserves. In 1988, 5 443 m of diamond drilling in 85 holes outlined proven reserves of 124 606 t, grading 10.42 g of gold per t and 98 g of silver per t. Drill-proven underground reserves amount to 71 924 t, grading 13.18 g of gold per t and 433 g of silver per t. Both open-pit and underground proven reserves amount to 196 530 t, grading 11.42 g of gold per t and 221 g of silver per t. Reserves in all categories (proven, probable and possible) amount to 577 414 t, grading 11.78 g of gold per t and 197 g of silver per t.

The joint venture has concluded that the precious metal reserves from a number of zones can support a 270 t-per-day (tpd) mill for at least six years. The zones include the Brown-McDade, Heustis, Webber, Flex and Cabin Creek zones.

In 1988, BYG Resources acquired the TAWA property, located 10 km north of the Mount Nansen property (14). Six drill holes, totalling 377 m, and stripping and trenching revealed three separate mineralized zones. All six holes were drilled in the BRX zone. The gold-bearing zones were less than 2 m wide.

In the Mount Freegold area, Archer, Cathro and Associates (1981) Ltd. explored on the ANTONIUK and NUCLEUS properties (13) for Big Creek Joint Venture and Chevron Resources Ltd. On the ANTONIUK property (13), 35 rotary holes totalling 1 087 m defined the upper 20 m in the mineralized area suitable for test heap-leach mining. There are 3.73 million t of low grade oxide ore in reserves, with an average grade of 1.13 g of gold per t. On the nereby REVENUE property (13), two holes totalling 295.6 m intersected low-grade gold.

Other Mount Freegold (13) area drill programs were conducted on Rea Gold Corporation's RAG and GOLDY properties, Noranda Exploration's EMMONS HILL property and Doron Exploration's CARIBOU CREEK property. All companies reported gold assays from drill intersections. Intersections from five drill holes of a 12-hole program by Doron Explorations Inc. on the CARIBOU CREEK property, averaged 40.8 g of gold per t over 2.9 m. This property adjoins Doron's LA FORMA property where drill proven reserves are estimated at 181 000 t averaging 13.03 g of gold per t.

Ruby Range

Archer, Cathro and Associates (1981) Ltd. explored the SHUT property (16) for Pezgold Resources Ltd. under an option agreement with Silverquest Resources Ltd. and Dalbianco Syndicate. Chip samples taken from trenches in the east zone assayed 30 g of gold per t over 0.37 m.

Kluane Ranges

All-North Resources Ltd. conducted an extensive surface and underground drill program to increase the reserves of the east and west zone of the WELLGREEN deposit at the former Wellgreen nickel-copper mine property (42). Drill inferred reserves reported in January 1989 were 42.3 million t with an average grade of 0.35 per cent copper, 0.36 per cent nickel, 0.51 g of platinum per t, 0.34 g of palladium per t and other values of platinum group elements, gold, silver and cobalt. During 1989, All-North plans to conduct a drill program to delineate further and expand existing reserves in the Wellgreen deposit.

Drilling and trenching on the adjoining ARCH and LINDA properties (42) encountered disseminated mineralization comparable with that on the WELLGREEN property. One LINDA drill hole assayed 3.51 per cent nickel, 1.66 per cent copper, 2.74 g of platinum per t, 7.13 g of palladium per t and 3.04 g of other platinum group elements per t across 1.2 m. Several other companies including Nathan Minerals Ltd., Lodestar Explorations Ltd., Harjay Exploration Ltd. and Polestar Exploration Inc. explored similar targets.

Rancheria District

In the Rancheria area, Fairfield Minerals Ltd. and Total Energold Corporation continued advanced exploration work on the LOGAN property (31). The 1988 program consisted of 6 400 m of diamond drilling, backhoe trenching and both geochemical and geophysical surveys designed to test targets on strike from the main zone. With additional reserves identified at depth, the main zone of the Logan deposit contains an estimated 12.24 million t grading 6.17 per cent zinc and 26.4 g of silver per t and includes 8.07 million t amendable to open-pit mining. A preliminary economic evaluation of the property was underway at year end.

Fairfield Minerals Ltd. announced the discovery of an oxidized silver-lead zone, which was exposed in trenches on the TIM property (30), under option to Chevron Minerals Ltd. The oxide zone is up to 30 m wide. A sample taken across a 4-m width averaged 352.4 g of silver per t and 9.12 per cent lead.

In January 1988, Silver Hart Mines Ltd. announced plans to develop its HART (CMC) property (26). During the year, no exploration work was conducted on the property.

Archer, Cathro and Associates (1981) Ltd. conducted exploration work on the NITE (30) and GRAVEL properties (32) where silver-bearing veins are present.

Pak-Man Resources Ltd. and 2001 Resource Industries Ltd. drilled the LIZ and JEFF properties (30) located near the Tim property.

Southeastern Yukon

Canamax Resources Inc. completed 4 654 m in a 23-hole drill program on the North Hill zone of its MOUNT HUNDERE property (29), located north of Watson Lake. The North Hill zone is 3.2 km from the Jewelbox Hill area, where previous work outlined drill indicated reserves of 2.8 million t grading 12.9 per cent zinc, 8.4 per cent lead and 65 g of silver per t. The drilling on the North Hill zone cut several sections of skarn containing rich silver-lead-zinc mineralization. One hole intersected 10.8 m grading 4.62 per cent combined zinc-lead and 583 g of silver per t.

In December, Canamax Resources announced that the combined reserves of Jewelbox Hill and North Hill zones amount to 4.7 million t with an average grade of 13.3 per cent zinc, 5.3 per cent lead and 63.8 g of silver per t.

Tintina Trench

In January 1988, Golden Nevada Resources Ltd. and Noranda Inc. announced a spectacular drill intersection of 31.5 m averaging 11.66 g of gold per t and 150.9 g of silver per t on the GREW CREEK property (b). Following a small staking rush in late 1987 stimulated by the Grew Creek gold discovery, several properties along the Tintina Trench were staked and explored in 1988 for epithermal gold associated with Tertiary volcanics.

In June 1988, six of the 15 holes completed by Golden Nevada Resources on the Grew Creek property showed significant gold values. At year's end, reserves were reported at 505 000 t averaging 9.60 g of gold per t. In the Hoole River (24, 25) area, gold and arsenopyrite were found on several properties explored by Welcome North Mines Ltd.

Ketza-Seagull District

On the GROUNDHOG property (33), Yukon Minerals Corporation drove a 300-m long exploration adit and completed approximately 2 300 m of diamond drilling. Estimated reserves in the No. 2 and No. 3 veins were 273 000 t grading 7.5 per cent combined lead and zinc and 137.1 g of silver per t.

Equity Silver Mines Ltd., under agreement with Fairfield Minerals Ltd., drill tested five areas on the RAM property (33) with 31 holes totalling 3 723 m. The drill program returned one intersection of 0.4 g of gold per t and 32.7 g of silver per t over 17.4 m and a second intersection of 1.24 g of gold per t over 3 m.

On Cominco Ltd.'s TAY-LP property (33), Pacific Comox Resources Ltd. drilled six holes totalling 847 m to test arsenic anomalies on strike of a known gold bearing vein system. The best hole intersected three zones, one of which assayed 6.2 g of gold per t over 5.0 m.

Macmillan Pass Area

Cominco Ltd. optioned Hudson Bay Mining and Smelting Co.'s TOM property (36) near Macmillan Pass and commenced a two-year drilling program to extend the reserves of the Tom deposit. Three of four deep holes totalling 2 224 m penetrated lead-zinc-silver-barite mineralization on the down-dip extension of the west zone of the Tom deposit. The reserves of the Tom deposit amount to 9 283 700 t with an average grade of 6.19 per cent lead, 7.49 per cent zinc and 69.4 g of silver per t.

Keno Hill District

In the Elsa area (a), United Keno Hill Mines Ltd. drilled 14 766 m in 316 holes to test 11 targets for high grade silver-lead ore. Numerous ore intersections were returned from 25 holes drilled in the Townsite 34 vein. Several high grade veins were also intersected in the Webfoot area. Five holes were drilled to test the northern strike extension of the Silver King vein. Three of these holes assayed in excess of 1 700 g of silver per t over 1.5-m widths.

West of Keno Hill district, Arctex Engineering Services Ltd. explored the HAWTHORNE property (9) for R. Riepe. Chip samples taken from quartz veins adjacent to the SCHEELITE DOME returned values as high as 63.4 g of gold per t and 674.7 g of silver per t. Similar veins occur on Queenstake Resource's DUBLIN GULCH property (10), where Can Pro Development Ltd. drilled five of the more promising veins. In the CATTO vein, intersections of 3.5 g of gold per t across 1.6 m and 11.2 g of gold per t across 2.7 m were reported. The PATRICIA vein returned similar grades over narrower widths. A new vein system returned 41.1 g of gold per t over a 1-m chip sample width.

Nash Creek Area

Drilling on NDU Resource's MARG property (39), 32 km northeast of Keno City, outlined 2.28 million t of indicated and probable reserves grading 2.0 per cent copper, 2.60 per cent lead, 5.1 per cent zinc, 65.1 g of silver per t and 1.03 g of gold per t. The 21-hole drill project was targeted on or near lead and arsenic anomalies and EM conductors. The discovery was located near a lead geochemical anomaly identified by a Geological Survey of Canada survey in the 1960s.

On the NICK property (44), an unusual shale-hosted, nickel-platinum deposit was investigated by Archer, Cathro and Associates (1981) Ltd. for NDU and Pak-Man Resources Ltd. Work in 1988 included geochemical sampling and four drill holes totalling 362 m.

On NDU Resource's BLENDE property (38), fault controlled breccia zones in dolomite contain zinc and lead. The best of a three-hole program totalling 718 m intersected 86.3 m grading 9.1 per cent combined lead-zinc and 106.3 g of silver per t.

Mines and Mineral Activities

Northwest Territories

Mineral Production

In 1988, mineral production in the Northwest Territories was derived principally from seven hard rock mines comprised of four gold mines and three zinc-lead-(silver) mines. The largest mine in the N.W.T., the Pine Point Mine, processed its last ore on April 6, 1988. At its peak production, the mine employed over 650 workers and accounted for close to 16 per cent of the N.W.T.'s total value of mineral production. In April, Treminco Resources brought the small Ptarmigan Mine, a former gold producer, back into production.

The value of mineral production in the N.W.T. was estimated at $766 million in 1988 compared with $713 million a year earlier. Much of the increase was due to higher zinc production and a steady rise in zinc prices during the year. With the closing of mill production at the Pine Point Mine in the first half of the year, the output of lead was reduced appreciably. Gold production value followed the downward trend of gold prices in 1988. Together zinc and lead production accounted for 71 per cent of the total value of mineral shipments while gold production accounted for 26 per cent.

During 1988, the most important mining development was the commissioning of Giant Yellowknife Mine's $25 million tailings re-treatment plant. It is designed to process 7 300 t of tailings per day and to recover about one half of the 2.3 g of gold per t contained in the Giant Mine tailings. Neptune Resources Corp. proceeded with construction of 9 000 t per day mill and open-pit mine project on its COLOMAC property, north of Indin Lake. Total construction and pre-production costs will be in excess of $150 million. In November, Treminco Resources Ltd. started work on a new head frame for the Ptarmigan mine shaft. Also, Noranda Inc. and Total Energold Corporation started a two-year, $35 million underground exploration program on the TUNDRA (FAT) property in the Courageous Lake area.

The mineral industry in the N.W.T. accounted for 23.1 per cent of the zinc, 20.2 per cent of the lead, 8.9 per cent of the gold and 1.8 per cent of the silver produced in Canada in 1988. The value of these metals combined with by-product bismuth and cadmium accounted for 5.5 per cent of Canada's metallic mineral production in 1988 compared with 6.4 per cent in 1987.

Operating mines in the N.W.T. directly employed 1 848 persons during 1988 compared with 2 110 in 1987.

Mines

Canada Tungsten Mining Corporation Limited, Cantung Mine

The Cantung mine at Tungsten remained on a care-and-maintenance basis throughout 1988. The company announced that detailed plans for re-starting and operating the mine are ready for implementation when tungsten markets improve. The mine closed in August 1986 because of low world tungsten prices.

Cominco Ltd., Polaris Mine

The Polaris zinc-lead mine (b) on Little Cornwallis Island, is the western world's most northerly base metal mine. During 1988, Cominco Ltd. sold a 45 per cent interest in the Polaris mine to Pine Point Mines Ltd. Cominco continues to operate the mine and market its concentrate production on behalf of both companies.

Polaris achieved record production in 1988 by mining and milling 1 016 000 t of ore to produce 220 400 t of zinc concentrate with an average grade of 61.2 per cent zinc and 44 000 t of lead concentrate with an average grade of 77.9 per cent lead. Ice conditions for the 1988 shipping season were favourable and 10 concentrate vessels and two freight vessels were handled from July 15 to October 19.

Type:	underground
Location:	Little Cornwallis Island (120 km northwest of Resolute)
Product:	zinc, lead
Mill Capacity:	2 100 – 3 100 tpd
Tonnes Milled:	1 016 000 t
Reserves:	14.0 million t (December 31, 1988)
Reserve Grade:	14.2 % zinc and 3.8 % lead
Employees:	272 (December 31, 1988)

Table 3:
Mineral Production of Operating Mines in the Northwest Territories, 1986, 1987, 1988 and Employment, 1988

Company, Mine and Commodity	1986 t	1986 kg	1987 t	1987 kg	1988(P) t	1988(P) kg	Number of Employees (1)
Canada Tungsten Mining Corporation Limited							
tungsten trioxide	1 782	------	nil*		nil*		nil*
Cominco Ltd.							
Polaris Mine							
zinc	114 000	------	128 800	------	134 800	------	272
lead	25 000	------	26 500	------	34 200	------	
Echo Bay Mines							
Lupin Mine							
gold	------	6 069	------	6 006	------	6 297	409
silver	------	995	------	882	------	N/A	
Giant Yellowknife Mines Ltd.							
Giant Mine							
gold	------	1 993	------	2 380	------	2 013	437
silver	------	767	------	N/A	------	N/A	
Salmita Mine							
gold	------	1 529	------	545	------	nil*	nil*
silver	------	247	------	114	------	nil*	
Nanisivik Mines Ltd.							
zinc	60 241	------	57 900	------	63 100	------	200
lead	3 528	------	2 500	------	1 000	------	
silver	------	25 372	------	23 000	------	22 200	
Nerco Con Mine Ltd.							
Con Mine							
gold	------	2 777	------	2 576	------	2 551	502
silver	------	574	------	622	------	510	
Pine Point Mines Ltd.							
zinc	238 625	------	287 682	------	81 748	------	112
lead	109 815	------	114 185	------	26 026	------	
Treminco Resources Ltd.							
gold	------	72	------	102.2	------	258.2	28
silver	------	N/A	------	10	------	N/A	
TOTAL							1 848

Source: Department of Indian Affairs and Northern Development. These figures are those reported by the mines as production and will not match Statistics Canada's production figures which are based on metals sold or shipped.

N/A = Not available -- = nil nil* = mine closed
(P) = Preliminary (1) = number of employees at year end 1988

Echo Bay Mines Ltd., Lupin Mine

The Lupin gold mine (d) is located 90 km south of the Arctic Circle and approximately 400 km northeast of Yellowknife. In 1988, the Lupin mill processed 1 687 t of ore per day with an average grade of 10.59 g of gold per t. This compares with 1 686 t of ore per day and 10.29 g of gold per t a year earlier. In September 1988, the company renewed a shaft deepening program at a depth of 778 m. By year end the shaft had been sunk to a depth of 890 m. A new access level was driven to establish the continuity of the ore deposit at depth.

Type:	underground
Location:	400 km northeast of Yellowknife
Product:	gold
Mill Capacity:	1 600 – 2 000 tpd
Tonnes Milled:	1 687 tpd
Reserves:	3.57 million t (December 31, 1988)
Reserve Grade:	10.89 g/t gold
Employees:	409

Giant Yellowknife Mines Ltd., Giant Mine

The mill at the Giant gold mine (a) processed 328 691 t of ore with an average grade of 7.31 g of gold per t for an output of 2 012.6 kg of gold. This compares with 338 655 t averaging 8.09 g of gold per t and an output of 2 379.9 kg of gold a year earlier. Lower ore grades in 1988 were due to increased production for open-pits (43.5 per cent of ore) to compensate for a tonnage shortfall from underground workings and generally, a lower grade of ore from underground workings.

On May 1, 1988, the company commissioned its $25 million tailings re-treatment plant and related facilities. The plant is designed to process 7 300 t of tailings per day and has an expected life of six years of seasonal processing based on 1987 tailings reserves. The re-treatment plant produced 210.9 kg of gold from 857 132 t of tailings before closing on October 21 as cold weather set in.

Type:	underground with small open-pits on surface
Location:	2.4 km north of Yellowknife
Product:	gold
Mill Capacity:	1 000 tpd
Tonnes Milled:	328 691 t
Reserves:	1.0 million t (December 31, 1988)
Reserve Grade:	8.54 g/t gold
Employees:	437

Tailings Re-treatment Plant

Capacity:	7 300 tpd
Tonnes Processed:	857 132 t
Reserves:	6.08 million t (December 31, 1988)
Reserve Grade:	2.4 g/t gold

Nanisivik Mines Ltd., Nanisivik Mine

Production at the Nanisivik Mine (d) in 1988 amounted to 676 000 t of ore grading 9.7 per cent zinc, 0.4 per cent lead and 40 g of silver per t. This mill throughput resulted in an output of 63 100 t of zinc contained in 113 100 t of concentrate, 1 000 t of lead contained in 1 700 t of concentrate and 22 000 kg of silver. Approximately half of the mill feed came from the main lens deposit and the rest from the lower lens and satellite deposits.

Six concentrate shipments were made during the Arctic marine navigation season in 1988. The total concentrate shipments were the largest since 1983 and nine per cent more than in 1987.

Type:	underground
Location:	27 km east of Arctic Bay, Baffin Island
Product:	zinc, lead, silver
Mill Capacity:	2 000 tpd
Tonnes Milled:	676 000 t
Reserves:	2.53 million t (December 31, 1988)
Reserve Grade:	10.1% zinc, 0.4% lead, 45 g/t silver
Employees:	200

Nerco Con Mine Ltd., Con Mine

The Nerco Con mine (a) celebrated its 50th anniversary in August 1988. This mine was the original gold mine in Yellowknife when it started production in September 1938 under the Consolidated Mining and Smelting Co. Ltd. (now Cominco Ltd.)

The Con Mine produced 2 551 kg of gold and 510 kg of silver from 207 097 t of ore milled in 1988. In 1987, the company produced 2 576 kg of gold and 622 kg of silver.

Type:	underground
Location:	1.4 km south of Yellowknife
Product:	gold, silver
Mill Capacity:	675 tpd
Tonnes Milled:	207 097 t
Reserves:	2.26 million t (December 31, 1987)
Reserve Grade:	10.42 g/t gold
Employees:	502

Pine Point Mines Limited, Pine Point Mine

Mining at the Pine Point zinc-lead mine (e) was discontinued during the summer of 1987. However, the mill continued to process stockpiled ore until the ore was depleted in April 1988 at which time mill operations ceased permanently. Shipments from the concentrate stockpile on the mine property should be completed in 1991. The town of Pine Point was closed and abandonment and restoration activities were proceeding during the year.

Mill production amounted to 137 400 t of zinc concentrate with an average grade of 59.3 per cent zinc and 33 200 t of lead concentrate with average grade of 78.4 per cent lead. The ore milled amounted to 888 300 t with an average grade of 9.7 per cent zinc and 3.3 per cent lead. This compared with 3 187 000 t grading 9.6 per cent zinc and 3.9 per cent lead a year earlier.

Type:	open-pit
Location:	Pine Point
Product:	zinc, lead
Mill Capacity:	9 100 tpd
Tonnes Milled:	888 300 t
Reserves:	750 000 t (December 31, 1987)
Reserve Grade:	10.4 % zinc, 3.4 % lead
Employees:	12 (December 31, 1988)

Treminco Resources Ltd., Ptarmigan Mine

The company brought the Ptarmigan gold mine (a) into production on April 1. From April 1, 1988, to January 31, 1989, 23 385 t of ore was trucked and processed at Giant Yellowknife's mill to produce 416.5 kg of gold.

During the year, the 900 foot-deep Ptarmigan shaft was re-equipped with a new head frame and hoist to provide access to the third level. The first two levels are accessed by a decline. The company plans to complete construction of a 180 t-per-day mill on the Ptarmigan mine site by June 1989.

The company's Tom gold mine, located near the Ptarmigan mine, was re-opened in July and a decline was driven to the second level. At year's end, the mine had reserves of 18 140 t grading 12.08 g of gold per t.

Type:	underground
Location:	20 km east of Yellowknife
Product:	gold
Mill Capacity:	nil
Tonnes Milled:	23 385 t (to January 31, 1989)
Reserves:	127 000 t (December 31, 1987)
Reserve Grade:	13.0 g/t gold
Employees:	28

Development

During 1988, Giant Yellowknife Mines Ltd. expended $20.2 million on construction of its tailings re-treatment plant and related facilities. The plant is located at the Giant Mine and is designed to treat 6.4 million t of tailings grading 2.3 g of gold per t over a period of six years. It commenced production in May 1988. It will normally operate from May to the end of October.

Neptune Resources Corp. began construction of a 9 020 t per day mill to service its Colomac gold property (3) located north of Indin Lake, 212 km north-northwest of Yellowknife. Supplies and equipment were brought to the site in the spring of 1988 by winter road at a cost of $10 million. With proven and probable open-pit reserves of 25.5 million t grading 1.9 g of gold per t, Neptune Resources plans to start production in 1990. The mine and mill project will cost over $150 million. The plant is designed to produce 6 200 kg of gold annually and reserves are sufficient to sustain production for eight years.

Noranda Inc. and Total Energold Corporation started a two-year $35 million underground exploration program on the TUNDRA project (13). The drill-defined potential in-situ reserves of the Tundra deposit amount to 29.5 million t averaging 6.86 g of gold per t with lesser contained tonnages at higher cut-off grades. The joint venture commenced sinking a 457-m vertical shaft in July 1988 and completion was expected in mid-April 1989. Following sinking of the shaft, an extensive underground development program with drifts and raises will be conducted to provide stations for underground exploration drilling. By the end of 1989, the joint venture partners expect to complete a mine feasibility study.

Urangesellschaft Canada Ltd. commissioned a pre-feasibility study of its KIGGAVIK (LONE GULL) uranium property, located 75 km west of Baker Lake (60). The resulting study indicated that the deposits could support a 1 000 t per day mill with an average grade of ore containing 0.5 per cent U_3O_8. The company plans to obtain environmental approvals and begin construction of the mine facilities in the 1990s. The mine is expected to operate from 1994 to 2004, with a possible extension beyond 2004.

The project is being reviewed by a Federal Environmental Assessment Review Office (FEARO) panel and public consultations will take place in 1989. During 1988, the company conducted environmental baseline studies and completed 4 070 m of geotechnical drilling to evaluate ground conditions at potential construction sites.

Mineral Exploration

Exploration expenditures in the N.W.T. were estimated at approximately $112 million in 1988. At least 157 properties were explored and 69 of these were drilled. Gold continued to be the leading target commodity. Most of the gold exploration was directed to properties in Slave Structural Province, north of Great Slave Lake, where 46 properties were drilled and another 43 properties were explored without drilling. In Keewatin District, the Archean Kaminak volcanic belt (south and west of Rankin Inlet) and Proterozoic rocks in the Baker Lake area were targeted for gold. Seven gold properties were drilled and 19 were explored without drilling.

Platinum was the second target commodity after gold. Thirteen projects were directed to platinum group metals. Uranium exploration was limited to three projects in Bear Structural Procure, in an area east and southeast of Great Bear Lake, and five projects in the Keewatin District, in the area west of Baker Lake. Lead-zinc exploration was confined to drilling near the Nanisivik and Polaris mines in the high Arctic. The former producing EL BONANZA silver property was drilled for silver.

Among promising exploration projects, two polymetallic (silver-zinc-lead-gold) deposits were explored by drilling in the Beaulieu River (12) volcanic belt on properties held by Aber Resources Ltd. and Silver Hart Mines Ltd. A gold deposit was defined by drilling on Athabasca Gold's NICHOLAS LAKE (5) property.

MINERAL EXPLORATION AND MINING NORTHWEST TERRITORIES – 1988

LEGEND

△a Producing Mines

a Giant Yellowknife Mines Ltd., Au, Ag
Nerco Ltd.(Con Mine), Au, Ag
Treminco Resources Ltd., Au, Ag

b Cominco Ltd., (Polaris Mine), Pb, Zn

c Nanisivik Mines Ltd., Pb, Zn, Ag

d Echo Bay Mines Ltd., (Lupin Mine), Au, Ag

e Pine Point Mines Ltd., Pb, Zn

100km 0 100km

Road

Areas of Exploration Activity
Refer to N.W.T. Table and Text

URANIUM

GOLD, SILVER

ZINC, LEAD, COPPER

PLATINUM

LITHIUM, DIAMOND, BARITE, IRON
BERYLLIUM, SOAPSTONE

ALASKA
YUKON
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
GREENLAND
Arctic Ocean
Hudson Bay
BANKS ISLAND
VICTORIA ISLAND
BAFFIN ISLAND
NORTHWEST TERRITORIES
Arctic Circle
Mackenzie River
Inuvik
Norman Wells
Fort Simpson
Yellowknife
Fort Smith
Pine Point
Coppermine
Cambridge Bay
Resolute
Baker Lake

Table 4
Mineral Claims in N.W.T.: Recorded, Cancelled and in Good Standing, 1987 and 1988

	1988	1987
Recorded		
No. of Claims	1 098	838
Area in Hectares	739 928	552 385
Cancelled		
No. of Claims	4 448	6 031
Area in Hectares	464 348	430 657
In Good Standing (December 31)		
No. of Claims	16 702	20 052
Area Hectares	3 115 983	2 829 503

Because of block staking in the N.W.T., a claim may range from 20 to 1 000 hectares. The net result of claim staking and claim lapsing during 1988 was that 3 350 fewer claims were in good standing at year end. However, those in good standing covered 285 580 more hectares than in the previous year.

Exploration Projects

Southern Slave Structural Province
Yellowknife and Clan Lake Volcanic Belts

Among gold projects, Canamax Resources Inc. drilled the NOSE claims (5) in the Clan Lake volcanic belt, 45 km north of Yellowknife. Golden Marlin Resources Ltd. completed an induced polarization survey on the MARLIN claims (a) on Yellowknife Bay. Nathan Minerals Inc. drilled the PRO and ANNE claims (a) north of Yellowknife. Noranda Exploration drilled the BELL 3 claim (5) near Sito Lake, north of Yellowknife. Pamorex Minerals Inc. drilled the PRN 2 and VARGA 2, 1 claim north of Yellowknife (a). However, four widely spaced holes totalling 447 m did not intersect significant gold values. Pacific Trans-Ocean Resources Ltd. completed two drill programs east of the Clan Lake volcanic belt on the PTX claim (6), northwest of Gordon Lake.

Athabaska Gold Resources Ltd. reported several good gold intersections from drill holes on the NICHOLAS LAKE property (NIC claims) (5), under option from Chevron Minerals. Out of nine holes reported in November 1988, the best 13 intersections averaged 24.0 g of gold per t over a width of 1.7 m. Most of the intersections occur in steeply dipping quartz veins. In February 1989, drill indicated reserves were reported at approximately 544 000 t grading 13.03 g of gold per t.

Yellowknife Supracrustal Basin

East of Yellowknife, the principal targets for gold were located in turbidite-hosted veins. Ardic Exploration and Development Ltd. in joint venture with Consolidated Thompson-Lundmark Gold Mines Ltd., continued drilling the past-producing Thompson-Lundmark gold mine property (6). The 1987 drill program was directed to testing extensions of the Kim vein and the previously unexplored Trail vein. In 1988, the drill target was a series of auriferous quartz lenses hosted in metasediments.

Canamax Resources Inc. drilled the TORO 1,2 claims (5) near Hook Lake. Hidden Lake Gold Mines Ltd. trenched and sampled the RUTH, RUTH NORTH and CHRISTINA 1 claims south of Gordon Lake (7). Treasure Island Resources Corp. drilled the JOON 2 claims (7). Both the Ruth North and Joon claims are former gold-producing properties.

Russell-Slemon Lakes Area

The principal target in this area was gold in amphibolitic sulphide-facies iron formation. Aber Resources Ltd. drilled on the CON claim (4) at the northeast end of Russell Lake. Asamera Minerals Inc. drilled the JANELLE 1 claim (4) on the north end of Russell Lake. Noranda Exploration Company Ltd. drilled the LEMON and RUSS 1 claims (4), north of Slemon Lake and west of Russell Lake respectively. Prolific Resources Ltd. drilled 925 m on the TOM and BAN claims at the southwest end of Russell Lake (4).

Beaulieu River Volcanic Belt

Aber Resources Ltd. and Hemisphere Development Corp. announced in January 1988 that drilling on the jointly-owned SUNRISE Lake property (12), 112 km east northeast of Yellowknife, indicated an important polymetallic sulphide deposit. In 1987, a 15-hole drill program totalling 1 542 m was completed. In 1988, further drilling outlined probable and possible geological reserves of 1 868 800 t grading 8.9 per cent zinc, 4.2 per cent lead, 404.6 g of silver per t and 1.03 g of gold per t. The reserves were calculated to a vertical depth of 664 m and the deposit is open at depth.

On the nearby BEAR 1,2 claims (12), Silver Hart Mines Ltd. drill tested two polymetallic sulphide zones similar in character to Aber's Sunrise Lake deposit described above. The zones are located several hundred metres to the east of the Sunrise Lake deposit. The BEAR sulphide zones were reported to contain 809 200 t with an average grade of 6.11 per cent zinc, 2.32 per cent lead, 220 g of silver per t and 0.89 g of gold per t.

Courageous-Mackay Lakes Volcanic Belt

On the past-producing SALMITA gold mine property (13), Giant Yellowknife Mines Ltd. drilled 14 surface holes totalling 9 000 m to test the favourable volcanic-sedimentary contact which hosted the recently depleted Salmita gold deposit. Several narrow zones of encouraging gold values were intersected, but grades and widths were not sufficient to warrant further investigation.

Noranda Exploration Co. Ltd. and Total Energold Corporation conducted a major exploration/ development program on the TUNDRA property (13). This program is described in this report under "Development".

Other exploration projects with drilling in the region were conducted by Bow Valley Industries Ltd. on the KR and TONY claims (13) and by Gunnar Gold – Mill City Gold on the MOG I-4 claims (13).

Indin Lake Belt

Neptune Resources Ltd. carried out fill-in drilling on its COLOMAC property (3) between zones two and three. The company announced in January 1989 that mineable ore reserves had been increased from 14.5 million t containing 31 103 kg of gold to 25.4 million t containing 48 521 kg of gold. Neptune plans to continue its drilling program in 1989 on the Colomac and Goldcrest deposits.

Golden Rule Resources Ltd. drilled on the ARSENO 2 and NORTH 2,7 claims (3), that were optioned from Lintex Minerals. The claims are located near the Leta Arm of Indin Lake.

Treasure Island Resources Ltd. drilled on the PEGLEG claim west of Spider Lake (3).

Other Areas of Southern Slave Structural Province

Among other companies with drill projects, Continental Pacific Resources Ltd. drilled on the ZEUS 2, GLEN 1 and LARK 1 claims (12) at Payne Lake. Lawrence Mining Corp. drilled on the JIM 1,2 claims (5) at Brown Lake and Viscount Resources Ltd. completed a geophysical survey and drill program on the JAY 2 claim (12) at Spencer Lake.

Northern Slave Structural Province

Among companies that conducted drill projects and/or geophysical surveys, Argus Resources Ltd. drilled on the MUSKOX claims (24) north of Thistle Lake to test conductive iron formation. Encouraging gold assays were obtained from the iron formation by surface sampling.

In northeastern Slave Province, Chevron Minerals Ltd. and Galveston Resources Ltd. drilled gold showings in iron formation on the LB claims (28).

Several localities in the George Lake area (23) were drilled by the Back River Joint Venture. In the Ellice River area (53), geophysical surveys were completed. In the Malley Rapids area (25), the joint venture conducted airborne geophysical surveys.

BPH-Utah Mines Ltd. conducted geophysical surveys to test sulphide-bearing volcanics on the TAK claims (19) and on the CROWN claims (20).

Bow Valley Industries Ltd. conducted ground geophysical surveys on the BINGO 1,2, NDR and TAN claims (d), as a follow-up to an airborne geophysical survey. The company also drilled iron formation on the OP claims (d), optioned from O.P. Resources Ltd.

Chevron Minerals Ltd. drilled iron formation on the Pistol Lake property (22) (FARN and KNUT claims) and trenched auriferous zones on the TURNER, TURN claim groups (22). The company also explored the extensive Hood River property (22). These properties were optioned by Chevron Minerals from Silver Hart Mines Ltd. Silver Hart reported geological resources on the Pistol Lake property of 490 000 t with an average grade of 12.69 g of gold per t. On the Turner Lake property, resources amount to 1.179 million t grading 5.35 g of gold per t.

Cody Hawk Resources Ltd. tested iron formation on the ROE and GAS 300 property (26) by VLF-EM and magnetometer surveys. The GAS 300 claim was optioned from Cominco Ltd.

Cogema Ltd. conducted a geophysical survey on the SEB 1 claim (d) on the eastern shore of Contwoyto Lake.

Cominco Ltd. conducted an airborne geophysical survey over the COCO 1-9 claims (d) east of Contwoyto Lake to delineate iron formation. Cominco followed-up the airborne geophysical survey of the REN claims (16) near Itchen Lake by a ground geophysical survey and a drill program.

The Cominco-Cogema Joint Venture performed ground geophysical surveys and drilling to test iron formation on the AV, CTL, DIGGER, JON and PTC claims (17) west of Contwoyto Lake. On the east side of the lake, the GOLD claims (d) were explored by geophysical surveys.

Contwoyto Goldfields Ltd. performed geophysical surveys on the IF 1, 3 and BUCKET claim block (17) west of Contwoyto Lake in search of iron formation targets.

Echo Bay Mines Ltd. drilled on the Lupin mine lease (d) and on the DER 1 and PEN 1 claims to the south of the lease. The company also drilled iron formation on the CAR 9 claims (d) near Concession Lake, on the CUB 1 claim near Itchen Lake (18), and on the F1 claim near Leanne Lake (18).

Expeditor Resources Ltd. conducted magnetometer surveys on the TEC 13-16 (23), HY 1-3, 17-19 and TEC 1-12 claims (20) near the Hood River and on the TEC 7-9 claims at Casey Lake (25). North of Aitch Lake, a small line grid was surveyed by VLF-EM on Prospecting Permit 1144 (25). On the TEC 1-6 claims (23) in the Hackett River Volcanic Belt, ground magnetometer and VLF-EM surveys were completed as a follow-up to an airborne survey. The company also conducted magnetometer and VLF-EM surveys on the western side of the Back River volcanic complex (24), where it holds the HY 10-16 and HY 20-24 claims.

Hecla Mining Company of Canada Ltd. conducted geophysical surveys on the JOHN, SHIN, DLER, CAMP and ADD claim block (d) east of Contwoyto Lake. Selected targets were drilled.

Orofino Resources Ltd., in joint venture with Canuc Resources Ltd. and Dore-Norbaska Resources Ltd., drilled 40 holes totalling 3 000 m on the Arcadia property (21), on Coronation Gulf. The best results included a 23 m intersection grading 12 g of gold per t. Previously established geological reserves in two veins were estimated at 780 000 t grading 7.5 g of gold per t.

Pamorex Minerals Inc. drilled on the ALGOOD claims (25) and the JOYCE, TANIA and PATRICIA claims (26). Two short holes were drilled on the P claims (16), in the Itchen Lake-Point Lake area, that Pamorex optioned from Echo Bay Mines Ltd.

Windflower Mines Ltd. drilled an EM conductor on the NAT claim at Clinton-Colden Lake (27).

Bear Structural Province
East Arm of Great Slave Lake

At Thor Lake (63), Highwood Resources Ltd. and Hecla Mining Co., in a joint venture, drilled 2 100 m to test the yttrium and rare earth element potential of the Lake zone in the Blatchford Lake complex. The Thor Lake property contains reserves of 1.6 million t grading 0.76 per cent beryllium (Be).

William Kizan took a 300 kg sample of barite from the PEGGY K claim (62) for testing.

Raparee Resources Ltd. drilled 500 m in 10 holes on the FOX claims (8) Outpost Islands, the site of the past-producing Outpost Island gold mine.

Great Bear Lake Region

Exploration in Bear Province, southeast and east of Great Bear Lake, was directed to platinum group metals, uranium and silver.

Equinox Resources Ltd., in joint venture with Technigen Corporation conducted UT-EM surveys on the VALL and SPEE and MUSK claims on the Musk-ox intrusive complex (55). The target was platinum group metals. The joint venture completed a 1 200 m drill program but results were generally disappointing.

International Platinum Corporation conducted magnetometer and EM (UT-EM) surveys and drilled on the OX claims (55) on the Musk-ox intrusive complex, for platinum group metals.

CEGB Canada Exploration Ltd. drilled the "Damp" uranium-copper showing at Longtom Lake (58) on Prospecting Permit 1093 and explored in the Beaverlodge area (59). CEGB also explored the BULLWINKLE, BUD and CROSS claims in the Port Radium area (57) for uranium.

Octan Resources Ltd. drilled and trenched a property south of Port Radium (2) comprised of the EL BONANZA and BONANZA claims and other claims optioned from El Bonanza Mining Company Ltd. The latter company produced silver during the 1930s from the El Bonanza property. Octan acquired the mill and related facilities and the former silver producing mines of Terra Mines Ltd. in the Camsell River silver mining camp (2). These properties include the past-producing Silver Bear, Norex and Smallwood silver mines.

District of Keewatin and Part of Southeastern District of Mackenzie

Exploration in the district of Keewatin was directed to gold in the Archean Kaminak (Rankin-Ennadai) volcanic belt and to unconformity-type uranium deposits west of Baker Lake.

Borealis Exploration Ltd. drove a 330 m decline on its Fat Lake property (42) to a depth of 67 m. Drill proven geological reserves of the Fat Lake deposit were reported as 47 600 t averaging 11.14 g of gold per t to a vertical depth of 50 m. Exploration included 1 270 m of drilling and both ground magnetometer and VLF-EM surveys.

Claude Resources conducted a magnetometer survey near Sandy Beach Lake (36). Noranda Exploration Ltd. conducted IP surveys on claims in the Lothrop Lake area (37) that were optioned from Suncor Inc.

Dejour Mines Ltd. in joint venture with Nobel Peak Resources Ltd. completed a 10 350 m drill project on the Turquetil Lake properties (38). In August 1988, Dejour reported the best intersections, from 12 drill holes, yielded 4.31 g of gold per t over 38.2 m and 5.89 g of gold per t over 13.2 m.

Noble Peak Resources Ltd. completed a 3 350 m drill project on its Southwin project at Happy Lake (43), 144 km southwest of Rankin Inlet. The program yielded a 6.7 m intersection that assayed 8.89 g of gold per t. In the Quartzite Lake area (43), a 6 900 m drill project tested geophysical targets.

W.A. Hubacheck Consultants Ltd. explored gossans and associated EM conductors for gold in the Rochon Lake area (34) for Agnico Eagle Mines Ltd.

Sunmist Energy '86 Inc. continued exploration at Maguse Lake (39). The work included 3 050 m of drilling, VLF-EM, HL-EM and magnetometer surveys.

Sikaman Gold Resources Ltd. completed 16 drill holes totalling just over 1 000 m on its claims at Kaminak Lake (40) and at Maze Lake (43). The drilling targeted a number of EM anomalies which had been outlined by an airborne survey.

Canadian Nickel Co. Ltd. drilled 2 950 m and conducted a magnetometer survey on its IGLOO claims at Wilson Bay (44).

Pamorex Minerals Inc. drilled 1 045 m and conducted VLF-EM and magnetometer surveys on the SAM claims (31), west of Baker Lake.

Taiga Consultants Ltd. sampled uranium showings for gold and platinum group elements on permits held by Norgold Ltd. Attention was focused on Proterozoic felsic volcanic rocks on the Baker Lake (32) and Yathkyed Lake Basins (33). Comaplex Minerals Corp. also tested uranium showings for precious metals on its claims and prospecting permits in the Christopher Island area (45) east of Baker Lake.

Nonacho Basin

In the Nonacho Basin, southeast of Great Slave Lake (10), Kelmet Resources Ltd. acquired claims from PNC Canada Ltd. and Scurry-Rainbow Ltd. The company explored the area for unconformity-related, uranium-copper-gold-silver-platinum group element targets.

Also in the Nonacho Basin (10, 11), Fortune Minerals Ltd., Noranda Exploration Co. Ltd and William Kizan explored separate properties for gold.

Uranium Exploration

Exploration for unconformity-type uranium deposits was concentrated in the region west of Baker Lake.

Urangesellschaft Canada Ltd., in joint venture with PNC Exploration (Canada) Co. Ltd., completed 3 250 m of drilling and detailed resistivity, gravity and soil geochemical surveys on the SISSONS-SCHULTZ south property (60).

PNC Exploration (Canada) Co. Ltd. drilled 1 100 m on its SCHULTZ LAKE project (61). Work also included VLF-EM, gravity and detailed geochemical surveys.

CEGB Exploration Canada Ltd. explored areas of the Thelon Basin south of Aberdeen and Schultz lakes (60).

Nickel-Platinum Group Elements

Asamera Minerals Ltd., in joint venture with Comaplex Minerals Corp., drilled geophysical targets over the site of the past-producing Rankin Inlet nickel-copper mine (48). The drill program was designed to determine the platinum group element content of three zones of mineralization that had previously been located by North Rankin Nickel Mines. Comaplex Minerals Ltd. conducted magnetometer and Max-Min EM surveys on an extension of the mineralized zone.

Taiga Consultants Ltd., on behalf of Courageous Exploration Ltd. and Norman Minerals Ltd., conducted geochemical and VLF-EM surveys on permits and claims optioned from Comaplex Resources and Tempest Exploration Ltd. in the Snowbird-Ennadai volcanic belt (35).

Northern Commodities Overview

Zinc

In 1988, N.W.T. zinc production increased by 12.4 per cent over 1987 to reach 290 000 tonnes with a value of $477 million. Yukon produced 118 300 tonnes (a decrease of 19.5 per cent from 1987) valued at $194.9 million. The combined territories' production amounted to 32.6 per cent of Canadian zinc production. Strong demand and tight supply continued to push zinc prices upward throughout the year.

World mine production is not expected to change substantially until the early 1990s while zinc consumption is expected to continue to rise (at an average of approximately 1.3 per cent per annum) due to increasing use of galvanizing particularly in the automotive and construction industries.

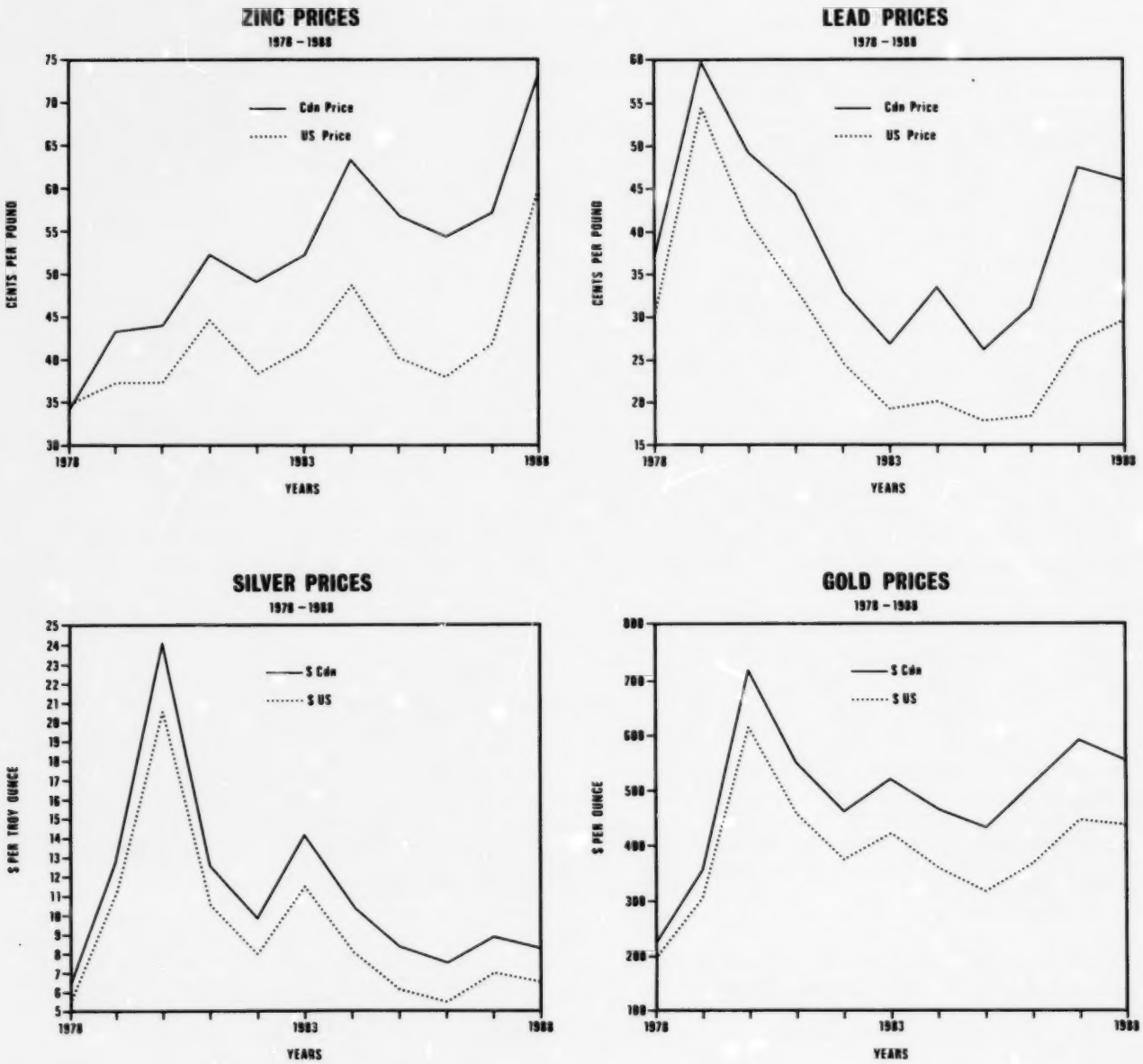


Figure 1 Metal Prices, 1978 – 1988

Lead

The N.W.T. lead production in 1988 was 67 200 tonnes (a 49 per cent decrease from 1987), with a value of $67.2 million. In 1988, the Yukon produced 152 000 tonnes of lead (an increase of 52 per cent from 1987) valued at $152 million. Combined territorial production amounted to 65.9 per cent of Canadian lead production. Lead prices remained stable and relatively strong throughout the year mainly due to good battery sales.

World supply of lead is expected to change little in 1989, but increases will begin in the early 1990's and consumption is expected to grow steadily. Prices should remain in the 66 cent per kilogram range in the near term.

Gold

The N.W.T. 1988 gold production dropped to 11.4 tonnes, a decrease of 2.7 per cent from 1987. Yukon production decreased as well by 7.9 per cent to 4.3 tonnes in 1988. The value of the N.W.T. and Yukon gold production was $197.9 and $74.6 million respectively in 1988. The combined value of territorial gold production represents 12.3 per cent of the value of Canadian gold production.

Silver

In 1988 Yukon silver production doubled from the previous year to reach 268 tonnes with a value of $66.3 million. Production in the N.W.T. in 1988 also doubled to reach 27 tonnes with a value of $6.8 million. The two territories' combined production of $73.1 million amounted to 19.4 per cent of Canadian silver production.

Silver prices decreased in 1988 with large stocks still dampening any price rallies. The market is still characterized by production exceeding demand. In 1989 silver prices are expected to stay in the range of $6–8.5 per troy ounce.

Pricing of Major Northern Metals

Zinc

The zinc industry during the 20th century has undergone four distinct demand growth periods. Although three of these periods have been characterized by strong growth, the fourth, from the middle 1970s to early 1980s was characterized by low growth and oversupply.

1900–1950

At the beginning of the century, western world zinc consumption was approximately 500,000 tons. This rose to 1.5 million tons by the beginning of World War II, reflecting increased industrial activity particularly in the use of galvanizing and brass. By 1950, zinc consumption reached two million tons, a four-fold increase in the first half of the century.

From 1900 to the beginning of World War II, zinc prices ranged from three to eight U.S. cents per pound. During World War I prices rose as high as 13 U.S. cents per pound.

1950–1973

The 1950–73 period was characterized by economic growth rates around the world of approximately 4.5 per cent, however, zinc demand rose at over 5 per cent per annum. The major increases in zinc consumption initially resulted from reconstruction of economies following the depression and Second World War. This was followed by the 1960s, a period of blossoming consumer spending.

During this period, galvanizing was the largest consumer of zinc. Its share of zinc consumption rose from approximately 30 per cent to 40 per cent. Initially galvanizing was used mainly for farm buildings and in household appliances. Automotive industry use was small. However, by the 1960s, galvanizing use in cars made the automotive sector a major consumer in North America.

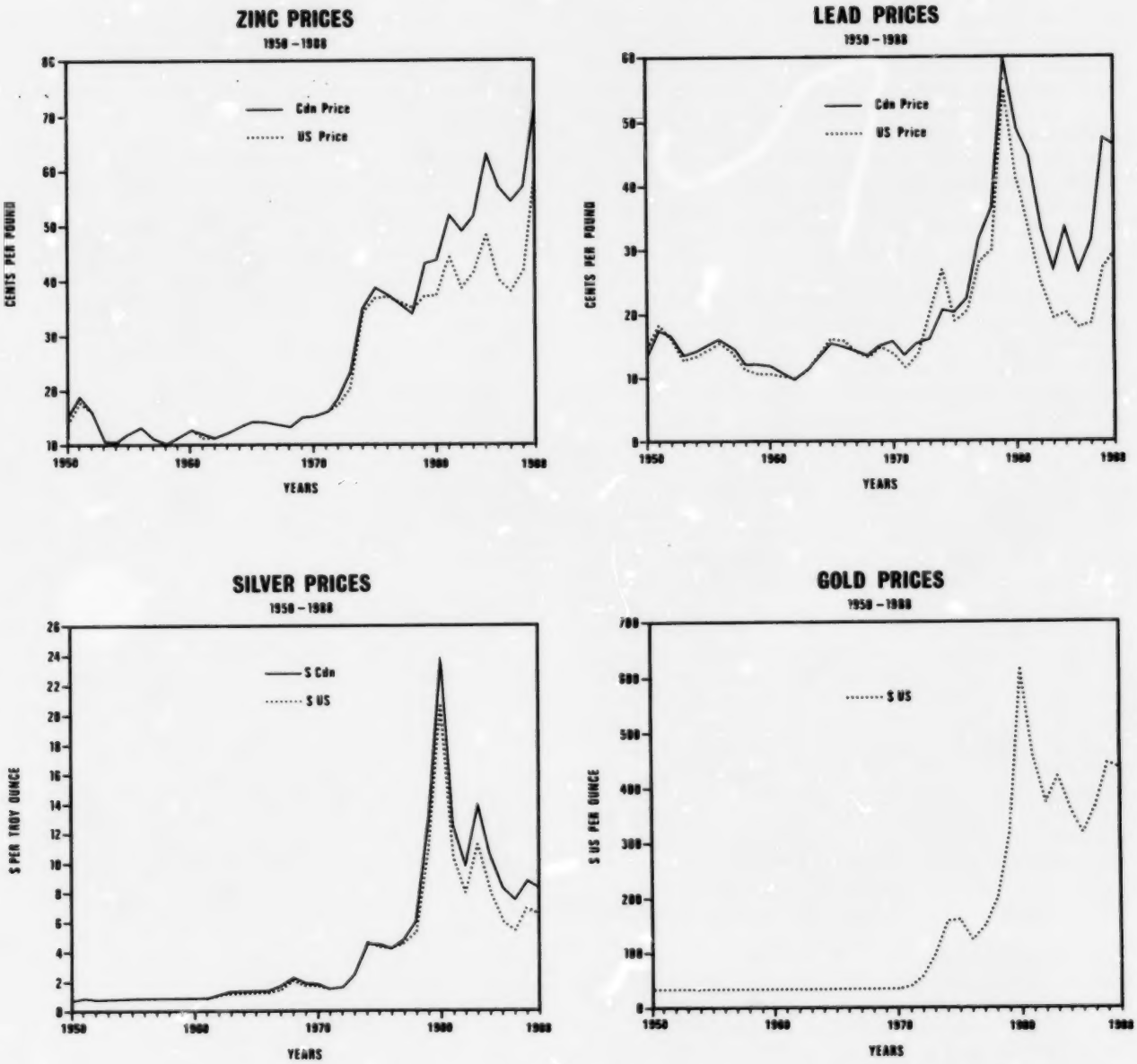


Figure 2 Metal Prices, 1950 – 1988

The next largest end-users of zinc were zinc die castings and brass, each providing approximately 20 to 25 per cent of zinc demand. Die castings, the fastest growing sector during the 1950s and 1960s, were primarily used in automotive parts, household appliance parts, machines and tools and plumbing/heating parts. Brass products included: sheet, strip, extruded and cast shapes, wire, pipe and rods. The remaining 25 per cent of demand was accounted for by semi-manufactured (strip and sheet) zinc, zinc oxides, dusts and chemicals.

From the early 1960s, castings and brass saw strong competition from alternate materials, mainly aluminum and plastics. New technology also led to more efficient use of material resulting in reduction in size and gauge which reduced the per unit amount of zinc consumed. However, increased overall demand increased zinc consumption.

Until 1973, mine capacity grew at or near the consumption rate. Existing operating mine capacity utilization was high and, in addition dormant mine capacity did not exist because of low rates of investment during the depression and the war years.

Increasing zinc consumption and supply, which moved in tandem, meant that the market was basically in balance. As shown in Figure 1, after World War II prices stepped up to the 10 cent range. Prices then rose until 1973 at, on average, 5 per cent per annum, which was equal to the growth rate of zinc consumption. Near the end of the period, zinc demand was growing so quickly that prices soared and it looked as though new mine capacity would not meet demand.

1974–1984

This period can best be described as a period of economic instability. Economic growth rates were much slower as a result of the end of the post-World War II reconstruction and industrialization, the saturation of the consumer goods markets and high inflation. The oil price shocks of the early 1970s further exacerbated the problem and led to major energy conservation measures which substantially impacted on metal demand. Growth in zinc demand slowed and even decreased in some years.

Zinc die castings were particularly hard hit as they were substituted for lighter materials (plastics and aluminum) in the automobile industry. This led to the development of the thin-walled die casts, with equal or better strength and much reduced quantities of zinc per unit. In other die casting markets, miniaturization and "thinning down" also occurred. The die casting share of zinc consumption fell from approximately 26 per cent in 1973 to 18 per cent by 1980. Improved galvanizing processes also reduced zinc requirements. However, the introduction of Galvalume in 1976 and Galfan in 1983, both zinc-aluminum galvanizing coatings, were two advances that helped maintain zinc consumption for galvanizing.

Chemicals and zinc dusts maintained their eight per cent of zinc demand despite falls in the industrial demand for zinc oxide in tires (radial plys with higher wear lives were developed) and as photocopying paper that did require coatings was developed. However, these declines were offset by large increases in chemicals/dusts demand in the newly industrialized countries.

Prices in 1973–74 took another step up to the 35 cent range as a result of two events: shortfalls in supply caused by strikes and shutdowns in major producer countries and rising prices due to demand exceeding smelting capacity.

During the late 1970s, annual supply exceeded or met demand but mine capacity was significantly above demand levels. Demand ranged from approximately 3.5 million tons (1975) to 5.5 million tons (1984), while capacities exceeded demand by some 46 per cent (1975) to 27 per cent (1984). Prices through the 1970s remained at the 35 U.S. cents per pound level despite substitution brought on by the energy crisis. This occurred because zinc supply was, and still is largely, controlled by large western country producers who historically have exercised greater discipline in zinc production than producers of other metals such as copper.

The basic oversupply during the 1970s and the poor economic conditions of the early 1980s led to relatively low prices. High interest rates in the early 1980s led to a large appreciation in the U.S. dollar and a collapse in metals prices.

1983–1988

The poor economic returns, due to low metal prices, in the early 1980s meant that little new zinc capacity was brought on line. However, 1983 zinc consumption has risen every year and by 1986 was at an all-time high. Demand in 1988 was exceeding supply and this is pushed prices upwards.

Consumption for zinc is still principally centred around galvanizing, brass and zinc die casting alloys. It is anticipated that galvanizing will, in the near future, be the primary growth sector mainly due to increased consumption by the automobile industry as it improves corrosion protection. Other uses for zinc are remaining relatively stable.

Lead

Lead went through the same four distinct phases as did zinc though price level changes were less dramatic (see Zinc Section). Lead has been faced with substantial substitution pressures and environmental and health concerns have also impacted on consumption.

1900–1950

Lead consumption began the century at nearly 900,000 tonnes and reached 1.6 million tonnes by World War II.

Initially, lead's principle use was in lead pigments, mainly for paints. By the Second World War, the largest use of lead was in batteries; cable sheathing was second. Of increasing importance, was the use of lead in tetraethyl compounds used as anti-knock agents in gasoline.

The supply of lead is met by two sources: primary or mine production and secondary or recycled production. Prior to World War II most lead supply was derived from mine production since, at that time, uses for recyclable lead were limited. Secondary production grew after the war.

Prices, prior to the Second World War, stayed in the range of four to six U.S. cents per pound, except during World War I and in the 1920's when prices went as high as nine U.S. cents per pound.

1950–1973

Until the early 1970s lead demand was strong, with growth rates averaging four per cent annually or slightly below Western World economic growth rates of 4.8 per cent.

Since World War II, lead's primary use has been in original equipment (OE) and replacement batteries for automobiles and commercial vehicles. Lead, hardened by antimony was used in battery grids and poles. From 1945 to 1974, consumption of lead for batteries rose from 28 to 45 per cent of total lead demand mainly due to the huge increase in car ownership.

By 1960, the second largest uses for lead were cable sheathing and rolled and extruded lead products, each accounting for 18 per cent of lead consumption. Rolled and extruded products included: lead piping (largely replaced by copper and plastics over the period); and rolled sheet and stripping for roofing, flashings and similar applications. In the 1960s, lead use as shielding against nuclear radiations in reactor installations also developed. The use of lead for cable sheathing fell almost continuously from 1960 because of competition from plastics and aluminum sheathings and had decreased to approximately 10 per cent by the early 1970s.

Gasoline additives and pigments/compounds each accounted for an increasing per centage of lead consumption moving from 10 to 12 per cent over the 1960 to 1973 period. By 1973, with the increasing use of unleaded gasoline, demand for lead as an additive fell. Pigments and compounds are used in polyvinyl chlorides (PVC) as stabilizers (to prevent degradation of PVC), glass, ceramics and paints.

During the 1960s and 1970s both the primary and secondary sources of lead production grew as primary production could not meet demand. By the early 1970s secondary lead accounted for approximately 40 per cent of lead production.

During the period from the end of World War II to the early 1970s, lead prices remained relatively unchanged at approximately 15 U.S. cents per pound, though yearly prices fluctuated substantially (see Graph 2). The lack of major price improvement is attributable to the loss of some major uses (cable sheathing, pigments, etc.) which limited the growth of lead use.

1973–1984

In the early 1970s high antimony (used to harden lead) prices and the first energy crisis led to the downsizing of batteries and a reduction in lead content. This situation was offset by increases in the number of vehicles and the development of new specialty markets (i.e. electrically-driven vehicles).

From 1973 to 1979, annual world consumption rates grew at only 0.5 per cent, mainly due to saturation of the automobile market, reduction in intensity of use, the energy crisis and growing environmental and health concerns associated with lead.

During this period, the supply from mines remained relatively constant at around 2.5 million tonnes a year. This occurred because lead is primarily a by-product of zinc and silver mining. Refined lead production capacities during this period exceeded demand. The secondary lead sector balanced supply and demand since secondary refiners could quickly start or stop operations as prices changed.

1980–1988

Lead experienced the same 1980 price collapse as other base metals. Since 1983, lead consumption has grown steadily and, in early 1987, surpassed the 1977 peak of 4.1 million tonnes.

The primary use for lead is now the production of batteries, which accounts for approximately 60 per cent of lead consumption. Research continues on the production of smaller batteries, but many technical limits are being reached and no viable alternative technology is yet apparent. Rolled and extruded lead uses also remain important while consumption will like to continue declining for a number of uses including: gasoline additives, cable sheathing, pigments and compounds and lead alloys (though at rates slower than those expected during the next two years). Increasing concerns associated with lead in automotive emissions, has led to the gradual elimination of lead additives in gasoline. However, forecasts indicate requirements of approximately 100 000 tonnes a year will exist into the early 1990s. In other areas, (cable sheathing, pigments, etc.), the effects of technological change and substitution have already been felt.

New lead supplies could be further affected if there is a spread in U.S. jurisdictions adopting mandatory battery recycling laws. No new major uses for lead have been developed. World lead consumption is thus forecast to remain near four million tonnes per year in the near future.

Lead and Zinc Structural Demand Change

A major shift in consumption has occurred in the last 15 years, which will affect future demands for zinc and lead as well as other base metals. This has been the emergence of outstanding metal consumption growth rates in the "Newly Industrialized Countries (NIC)" and developing countries. The increases now mean that the NIC account for approximately 20 per cent of non-ferrous metals demand.

This drastic increase in share has occurred since 1974. Prior to that year growth in metals demand was driven by demand in member countries of the Organization For Economic Co-operation and Development (OECD). In the case of base metals, copper and zinc consumption grew by approximately 50 per cent from 1962-1974, of which 40 of the 50 percentage points was contributed by the OECD countries.

From 1974 to 1986, the picture reversed with OECD growth being flat or negative and NIC/developing countries consumption rising at the same percentage rate as in the 1962-1974 period. This trend could be seen with zinc where the NIC/developing countries share rose from 15 to 30 per cent while OECD-nation consumption remained flat. Thus all demand growth for metals has been driven by the NIC/developing countries. The NIC and developing countries have become the higher metal intensive consumption economies and this trend will continue at least for the forseeable future.

Gold

From 1900–1944, gold was the basis of the international monetary system. Each country fixed the value of its currency in terms of gold. After the Second World War, when international monetary arrangements were governed by the Bretton Woods Agreement (1944), the value of the U.S. dollar was set at $U.S. 35 per ounce of gold, all other currencies had their exchange rates fixed against the U.S. dollar.

During the mid-1960s lack of confidence in the U.S. dollar led to an increase in the speculative demand for gold. In 1968, this led to the establishment of a "two-tier" pricing system for gold. The monetary value for gold remained fixed at $U.S. 35 per ounce while its value for non-monetary purposes was determined by the free market. Increasing speculation against the U.S. dollar led to the revaluation of gold to $U.S. 38 per ounce in 1971 and to $U.S. 42.22 per ounce in 1973. In November 1973, the U.S. severed the link between the dollar and gold. Between 1974 and 1978, a general reform of the international monetary system ended the monetary role of gold. During this period, prices increased to the $U.S. 150 to $U.S. 200 level (see Figure 1). In 1980 the price peaked at just under $U.S. 800 per ounce. Since then prices have fluctuated between $U.S. 300 and $U.S. 500 per ounce.

During the 1980s, 67 per cent of the western world gold supply came from western world mine production, 20 per cent from recycled scrap and 13 per cent from imports from centrally planned economies. A generally favourable gold price during this period led to an average increase in western world mine production of over five per cent. South Africa has for many years been the world's largest producer; however, recent increases in production have occurred primarily in Canada, the U.S., Australia and Brazil.

Because of the large stocks of gold already in existence, it is the structure of the demand for gold which drives its price rather than the level of supply.

Of western world gold consumption today, jewellery fabrication accounts for 55 per cent, investment demand in the form of coins, wafers and bullion purchased by investors and central banks accounts for another 31 per cent and industrial fabrication for the remaining 14 per cent.

Industrial use is dominated by electronic applications and dental use. As such, the demand from this segment of the market is relatively stable and insensitive to fluctuations in gold price.

However, gold demand for jewellery fabrication, is sensitive to gold price fluctuations. As real gold prices rise in local currencies, jewellery fabrication tends to decline; and as real gold prices decline, jewellery fabrication increases. Because of this sensitivity to price changes, jewellery markets tend to act as a support for the price of gold at the lower end of its current trading range.

It is demand for gold as an investment which is the major determinant of gold price. The major influences which appear to stimulate investment demand for gold are a weakening U.S. dollar, rising commodity prices, and falling real (deflated) interest rates, inflation and global political instability. Conversely, a strong U.S. dollar, weak commodity prices and high real interest rates tend to depress investor demand for gold.

Silver

Like gold, silver has had a monetary role though less pronounced than gold. The silver market, unlike gold, during the 20th century has been a free market with the exception of from 1933 to 1963 when some price setting action took place. While the price of silver like the price of gold is influenced by investment demand the much larger per centage of industrial demand for silver makes it a more significant determinant of silver prices.

The free market price of silver from the beginning of this century to 1933 generally stayed within the range of 50 to 75 U.S. cents per troy ounce.

Between 1933 and 1963, the price of silver was influenced to a high degree by U.S. government intervention in the market. From 1933–45, a two-price system was in effect. The U.S. Treasury Department bought U.S. silver at a price which was the difference between the silver coinage value ($U.S. 1.2929) and a service fee (seigniorage) charged by the U.S. Treasury. In addition, an open market price for foreign silver was set by the large New York silver trader Handy and Harman. During this period, the average price of silver in major world markets remained relatively stable fluctuating in a narrow range (from $U.S. 0.646 to $U.S. 0.9505). From 1946 to 1961, large annual deficiencies in silver production versus consumption led to a substantial decline in the silver stocks held by the U.S. Treasury Department.

In 1963, silver was freed from U.S. government control and the U.S. stock of 1.7 billion ounces of silver sold initially at $U.S. 1.2929. Since the middle of 1967, silver prices have been set solely by market forces. Rising silver prices during the late 1960s forced governments to look for cheaper metals to replace silver in coinage (Canada converted to nickel in 1968).

Present Market

The present supply of silver comes from two sources: primary silver mines and as a by-product of other mining operations. Total western world silver production in 1988 was 11 500 tonnes. Only that silver which comes from primary silver mines, is price sensitive (approximately 30 per cent). The rest, which is not price sensitive, is produced as a by-product, primarily of lead-zinc or gold-silver operations. The per centage of by-product silver appears set to continue to increase in the early 1990s, with the development of a number of lead-zinc and gold mines which will have significant silver by-product production.

Silver demand is composed of industrial demand accounting for approximately 93 per cent and investment demand which accounts for the remaining seven per cent.

Prior to 1980, gold and silver prices tended to move in tandem responding to investor demand for precious metals. Both were seen as a store of wealth and as a hedge against inflation and currency fluctuations. Silver has been the individual's hedge against inflation in India and the Middle East, but also in the U.S. where, until recently, U.S. citizens could not hold gold. Stocks will flow from these individual holdings when prices are high or after natural or political disasters. The influence of these stocks on the supply of silver is compounded by significant western supply from silverware, hoards and family heirlooms which enter the market in times of high prices.

The major industrial use for silver is associated with the photographic industry which consumes 51 per cent of industrial demand silver. The second largest consumer (22 per cent) is the electrical and electronics sector. Three areas within the electrical sector promise increased silver demand: silver in windshields which permits for heated windshields; specular reflectors for fluorescent lighting fixtures; and silver-based military-type batteries. Jewellery accounts for approximately 15 per cent of silver consumption while brazing alloys and solder accounts for the remaining five per cent.

The 1979–80 price peak in silver (when prices reached $U.S. 50 per ounce) was an aberration brought on by the Hunt brother's attempt to corner the silver market. This dramatically affected investor interest which did not recover until the stock market crash of 1987.

The jewellery and silverware sectors saw the largest drop in demand as a result of the 1970 price surges. Demand from 1978 to 1980 halved and is still half that of a decade ago. The silver price spike of 1979-80 also caused consumers to use their silver more efficiently and increase recycling. For example, the photographic industry, from the mid 1970s to 1988 has reduced silver requirements by 60 per cent with no quality deterioration.

Silver demand, at least in the short term, has stabilized but mine supply will continue to increase at least until the early 1990s. The increasing supply therefore should ensure that prices will not rise substantially above $U.S. 5 to $U.S. 6 per ounce in the near future.

Table 5:
Exploration - Yukon Territory

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
1	Homestake	Forty Mile	Au
1		Fortymile River	Placer Au
2	Granges/Lode Resources	Sixtymile River	Placer Au
3	Berglynn	Klondike	Placer Au
3	Rise Resources/Gold City	Indian River	Placer Au
3	Arbor/Dawson Eldorado	Lone Star	Au
3	Esso Minerals	Sixtymile	Au, Zn, Pb, Cu
4	Queenstake	Stewart River	Placer Au
5	Homestake	Ballarat	Au
6	Chevron	Tombstone	Au, U
7	Noranda	Oro	Au, As
8	Danra	Zeta	Ag
8		Clear Creek	Placer Au
9	Arctex	Hawthorne	Au, Ag, Sb, W
10	Queenstake	Dublin Gulch	Au
10	Grandex	Mayo	Placer Au
11	Moosehorn	Reef	Au
12	Kerr Addison	Shadow	Au, Sb
13	Big Creek JV	Nucleus	Au
13	Big Creek JV	Revenue	Au
13	Rea Gold/Verdstone	Rag	Au, Ag
13	Rea Gold/Verdstone	Goldy	Au, Sb
13	Noranda	Emmons Hill	Au, Sb, Cu
13	Doron	Caribou Creek	Au
13	Big Creek JV	Antoniuk	Au
13	Mill City	Tinta Hill	Au, Cu, Ag, Pb, Zn
13		Dawson Range	Placer Au
13	Big Creek JV	Goldstar	Au
14	Freegold Venture	Tawa	Au, Ag
14	BYG Natural/Chevron	Mount Nansen	Au, Ag
14	Aurchem	Discovery Creek	Au, Ag, Pb, Zn
14	Noranda	Dows	Au
14	Chesbar/States Expl.	Vic	Au
14	Kerr Addison	Only	Au, Cu
15	Rexford/Kluane JV	Onion	Ni, Cu
15	Kluane JV	Arn	Au, Cu
16	Pezgold	Shut	Au, As
17	Pacific Trans-Ocean	Later	Au
17	New Era Developments	Red Ridge	Au, Ag, Pb, Zn
18	Omni	College Green	Au, Ag
19	B. Cofer	Rossbank	Au, Ag
20	Dunvegan	Jube	Au, Pb, Cu
21	L. Carlyle/D. MacDonald	BM	Au, Cu
21	Anooraq	Evelyn Creek	Rho

Table 5 (continued)
Exploration – Yukon Territory

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
22		Livingstone Creek	Placer Au
23	Prime Expl./Internat. Rhodes	Ran	Au
23	Welcome North	WLN	Au
23	Welcome North	Tint	Au
24	Welcome North	Rivier	Au
24	Welcome North	QC	Au
24	Welcome North	Mag	Au
25	Welcome North	URCU	Au
26	Silver Hart	Hart Silver (CMC)	Ag, Pb
27	AMP Expl.	Logjam	Au, Ag, Pb, Zn
28	Silverquest/NDU/Adrian	Hyland Gold	Au
29	Canamax	Mount Hundere	Ag, Pb, Zn
30	Chevron	Tim	Ag, Pb, Zn
30	Pak-Man/2001 Resources	Liz, Jef	Ag, Pb
30	Big Creek JV	Nite	Ag, Pb, Au
31	Fairfield/Total Energold	Logan	Ag, Zn
32	Big Creek JV	Gravel	Ag, Pb
33	Curragh	MM	Pb, Zn, Cu
33	Equity Silver	Ram	Pb, Zn
33	Yukon Minerals/Perrex	Groundhog	Ag, Pb, Zn
33	Pacific Comox	Tay-LP	Au
34	Curragh	Sea	Pb, Zn
35	Curragh	Faro NW	Pb, Zn
35	Curragh	Vangorda Plateau	Pb, Zn
36	Cominco	Tom	Pb, Zn, Ag, Ba
37	Cominco	Nidd	Pb
38	NDU Resources	Blende	Zn, Pb, Ag
39	NDU/SMD Mining/Noranda	Marg	Ag, Au, Zn, Pb, Cu
39	International Prism	Kathleen	Ag, Pb, Zn
40	Lodestar	Canalask	Cu
40	Harjay Expl.	Liberty	Au, Cu, Pb
41	Lodestar	Missy	Pt, Cu, Ni
41	Rockridge/Pac-Man	Airways	Pt, Cu, Ni
42	All-North	Wellgreen	Pt, Cu, Ni
42	Rockridge/2001/All-North	Linda	Pt, Cu, Ni
42	Nathan	Glen	Au, Ni, Cu, Pt
43	Polestar	I, IV, V	Pt, Ni, Cu
44	NDU/Pac-Man	Nick	Pt, Ni
a	NDU Resources	Clark	Pb, Zn
b	Prime Expl./Norman/Gigi	Grew Creek	Au
b	W.H. Pinkenburg	WHP	Au
b	Noranda/Golden Nevada	Grew Creek (Canyon)	Au, Ag
b	Prime Expl./Baywest	Ran	Au
b	Noranda/Mintel	Mintel	Au

Table 5 (continued)
Exploration – Yukon Territory

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
b	Noranda/Argo	Argo	Au
b	Akito-Lori/Noranda	Hemlo	Au
c	Prime Expl./Halcyon	Ram 5000	Au, Hg
c	A. Carlos	Eldorado	Au, Pb, Cu
c	Welcome North	Hoole	Au
c	Welcome North	Tor	Au
c	Welcome North	ETS	As
c	Welcome North	Star	Au
c	Welcome North	Kepi	Au
d	Berglynn/Skukum Gold	Goddell	Au, Zn
d	Pacific Trans-Ocean	Said	Au, Ag
d	Pacific Trans-Ocean	Glenlivet	Au
d	Academy	Mount Wheaton	Au, Ag
d	Adastral	Aul	Au, Ag
d	Total Energold	Charleston	Au, Ag, Zn
d	Pacific Trans-Ocean	Earl	Au
d	Omni/Skukum Gold	Skukum Creek	Au, Ag
d	Omni/Noranda	Scar	Au
d	Mt. Skukum Gold	Mount Skukum	Au, Ag
d	Total Energold	Mount Anderson	Au, Ag, Pb, Zn
f	Hudson Bay	Whitehorse Copper	Au, Cu

(1) Table Location is made with reference to corresponding numbers on Yukon and Northwest Territories maps. Locations are approximate.

(2) Abbreviated name of the Company is used: Expl. (Exploration), Ltd./Ltée (Limited), JV (Joint Venture).

(3) Geographical areas are indicated by small print, whereas claims and groups are capitalized. Abbreviated words are: Peninsula (Pen), River (R), Lake (L).

(4) Metal(s) of primary importance defined by chemical symbols: copper (Cu), gold (Au), lead (Pb), tantalum (Ta), lithium (Li), asbestos (Asb), molybdenum (Mo), silver (Ag), barium (Ba), cobalt (Co), tin (Sn), iron (Fe), tungsten (W), niobium (Nb), berylium (Be), rare earth elements (REE), mercury (Hg), antimony (Sb), uranium (U), flourite (F), gallium (Ga) and germanium (Gr), rhodonite (Rho).

Table 6:
Exploration – Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
1	Liard River Expl.	Liard River	Placer Au
2	Octan	El Bonanza	Ag
2	Octan	Silver Bear	Ag
3	Neptune	Colomac	Au
3	Golden Rule	ARSENO, NORTH	Au
3	Treasure Island	PEGLEG	Au
4	Aber	CON	Au
4	Asamera	JANELLE	Au
4	Noranda	LEMON, RUSS	Au
4	Prolific	TOM, BAN	Au
4	Hidden Lake	GERM	Au
5	Canamax	TORO	Au
5	Noranda	BELL	Au
5	Chevron/Athabaska	NIC	Au
5	Canamax	NOSE	Au
5	Lawrence	JIM	Au
5	Procan	Cameron River	Au
5	BHP-Utah	LONGSPUR	Au
6	Pacific Trans-Ocean	PTX	Au
6	Durga	Allen Lake	Au
6	Ardic	Thompson-Lundmark	Au
7	Treasure Island	JOON	Au
7	Hidden Lake	RUTH, CHRISTINA	Au
8	Rapparee	Outpost Islands	Au, W
8	Octan	Wilson Island	Au
9	Kelmet/Comaplex	East Arm	Au
9	Fred Loutitt	La Loche River	Au
10	Kelmet	MacInnes Lake	Au
10	Fortune	Salkeld Lake	Au
11	Noranda	CREST	Au
11	W. Kizan	TET, NEY	Au
12	Viscount	Spencer Lake	Au
12	Noranda	Sunset Lake	Au
12	Silver Hart	Sunrise Lake	Au
12	Aber/Hemisphere	Sunrise	Ag, Au, Zn, Pb, Cu
12	Continental Pacific	ZEUS, GLEN, LARK	Au
13	Procan	DANE	Au
13	Noranda/Total Energold	Tundra	Au
13	Bow Valley	KR, TONY	Au
13	Gunnar/Mill City	MOG	Au
13	Pamorex	Salmita	Au
14	Cogema	Courageous Lake	Au
14	Echo Bay	Lac de Gras	Au
15	Gunnar/Mill City	Winter Lake	Au

Table 6 (continued)
Exploration – Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
16	Cominco	REN	Au
16	Pamorex	TREE, TESS, P	Au
17	Cominco/Cogema	AV, CTL, DIGGER	Au
17	Contwoyto	IF, BUCKET	Au
18	Echo Bay	CUB, F	Au
19	BHP-Utah	TAK	Au
20	Expeditor	TEC, HY	Au
20	BHP-Utah	CROWN	Au
21	Orofino/Dore-Norbaska	Arcadia	Au
22	Chevron	FARN, KNUT	Au
22	Chevron	TURNER, TURN	Au
22	Chevron	Hood	Au
23	Expeditor	TEC 1-6	Au
23	Cominco	Camp Lake	Ag, Au
23	Back River JV	BRAU, George Lake	Au
24	Argus	MUSKOX	Au
24	Expeditor	HY	Au
24	Noranda	Thistle Lake	Au
25	Argus	Regan Lake	Au
25	Back River JV	MR	Au
25	Echo Bay	Back River	Au
25	Pamorex	ALGOOD	Au
25	Expeditor	TEC 7-9, Casey Lake	Au
26	Pamorex	JOYCE, TANIA, PATRICIA	Au
26	Pamorex	REX, MOR, PAM	Au
26	Echo Bay	Back River	Au
26	Cody Hawk	ROE, GAS	Au
27	Windflower	NAT	Au
28	Chevron/Galveston	LB	Au
28	Enexco	ENEX	Au
28	BHP-Utah	Tinney Hills	Au
28	Hi Tech/Expeditor/Mingold	Western River	Au
29	Abermin	Hope Bay	Au
29	Abermin	Koignuk River	Au
30	Asamera/Comaplex	Meadowbank	Au
31	Pamorex	SAM	Au
32	Taiga	Baker Lake	Au, Pt, U
33	Taiga	Yathkyed Lake	Au, Pt, U
34	Agnico	Rochon Lake	Au
35	Courageous/Norman	Snowbird Lake	Au
36	Claude	Sandy Beach Lake	Au
37	Noranda	Lothrop Lake	Au
38	Borealis	Padlei Lake	Au
38	Dejour/Nobel Peak	JOYCE	Au
39	Sunmist	Maguse Lake	Au
39	BHP-Utah	Kaminak Lake	Au

Table 6 (continued)
Exploration – Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
40	Placer-Dome	Kaminak Lake	Au
40	Sikaman	Kaminak Lake	Au
40	Borealis	Kaminak Lake	Au
41	Asamera	Carr Lake	Au
41	Asamera	O'Neill Lake	Au
42	Placer-Dome	Kaminak Lake	Au
42	Borealis	Fat Lake	Au
43	Noble Peak	Happy Lake	Au
43	Noble Peak	Quartzite Lake	Au
43	Sikaman	Maze Lake	Au
44	Borealis/Faraway	Pistol Bay	Au
44	Canadian Nickel	IGLOO	Au
45	Comaplex	MacQuoid Lake	Au
45	Comaplex	Christopher Island	Au, U
46	Agnico	Baker Lake	Au
47	Agnico	Daly Bay	Au
48	Asamera/Comaplex	Rankin Inlet	Pt, Ni, Cu
49	Hartz Equities	Wholdaia Lake	Pt
50	Stoney Rapids JV	Thye Lake	Pt
50	Stoney Rapids JV	Opescal Lake	Pt
50	Hartz Equities	Thye Lake (ANKI)	Pt
51	Equinox	CANA	Pt
51	Stoney Rapids JV	Scott Lake	Pt
52	Hartz Equities	Quinn Lake	Pt
53	Aber	Bathurst Inlet	Pt
53	Back River JV	Ellice River	Au
54	Aber	Bathurst Inlet	Pt
55	Equinox/Technigen	Muskox Intrusion	Pt
55	Internat. Platinum	OX	Pt
56	Aber	COREHILL	Pt
57	CEGB Canada	Port Radium	U
58	CEGB Canada	Longtom Lake	U
59	CEGB Canada	Beaverlodge Lake	U
60	Urangesellschaft	Kiggavik	U
60	Urangesellschaft/PNC Expl.	Sessions Lake	U
60	CEGB Canada	Schultz Lake	U
61	PNC Expl.	Schultz Lake	U
62	W. Kizan	PEGGY K	Ba
62	I. Hall	REX	Cu, Au
63	Highwood/Hecla	Thor Lake	Be, REE
a	Nathan	PRO, ANNE	Au
a	Pamorex	PRN, VARGA	Au
a	Golden Marlin	MARLIN	Au
b	Cominco	Little Cornwallis Is.	Pb, Zn

Table 6 (continued)
Exploration – Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
c	Nanisivik	Nanisivik Mine	Pb, Zn
d	Cogema	SEB	Au
d	Echo Bay	Lupin Mine	Au
d	Echo Bay	DER, PEN, CAR	Au
d	Hecla	JOHN, SHIN, DLER	Au
d	Cominco	COCO	Au
d	Bow Valley	BINGO, NOR, TAN, OP	Au

(1) Table Location is made with reference to corresponding numbers on Yukon and Northwest Territories maps. Locations are approximate.

(2) Abbreviated name of the Company is used: Expl. (Exploration), Ltd./Ltée (Limited), JV (Joint Venture).

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Table 7:
Mineral Production – Yukon Territory
1979–1988

Mineral		1979	1980	1981	1982	1983	1984	1985	1986	1987(R)	1988(P)
Gold	$	13 749 271	63 029 000	66 382 000	39 721 000	50 337 000	44 419 000	42 689 000	58 237 000	88 970 000	84 589 000
	kg	1 190	2 982	3 746	2 656	3 006	2 960	3 065	3 547	4 674 000	4 883
Silver	$	54 218 064	114 120 000	32 339 000	29 943 000	6 891 000	18 825 000	13 098 000	18 468 000	40 965 000	66 322 000
	kg	129 982	147 000	80 000	95 000	15 000	54 000	47 000	73 000	133 000	268 000
Lead	$	103 374 279	71 558 000	54 935 000	25 733 000	307 000	1 539 000	848 000	23 893 000	105 982 000	152 329 000
	kg	78 250 062	65 771 000	55 970 000	35 493 000	520 000	2 083 000	1 470 000	35 091 000	100 267 000	152 329 000
Copper	$	18 422 058	27 082 000	20 123 000	14 654 000	3 977 000		19 000	13 000	22 000	?
	kg	7 778 231	10 433 000	9 094 000	7 510 000	1 904 000		10 000	6 000	9 000	?
Zinc	$	109 460 866	88 313 000	94 237 000	58 519 000	31 000	244 000	137 000	61 521 000	187 336 000	330 927 000
	kg	113 572 783	90 938 000	78 806 000	54 537 000	27 000	173 000	109 000	50 634 000	147 045 000	200 927 000
Bismuth	$						2 000	11 000	5 000	2 000	2 000
	kg						162	1 000	541	?	?
Cadmium	$					6 000	9 000	5 000	8 000	13 000	458 000
	kg					2 000	2 000	1 000	2 000	2 000	24 000
Sand and Gravel	$				550 000	1 438 000	5 105 000	2 995 000	13 355 000	1 502 000	7 130 000
	t				463 000	480 000	3 074 000	1 185 000	4 902 000	352 000	1 550 000
Sulphur (smelter gas)	$							267 000	1 000	136 000	970 000
	t							2 000	7	1 000	10 000
Coal (E)	$	363 000	287 000	368 000					209 000	490 000	200 000
	t	23 003	16 529	20 860					17 223	20 000	10 000
Stone	$									679 000	2 800 000
	t									206 000	800 000
Rhodonite	$										212 000
	kg										
TOTAL	$	299 244 538	364 389 000	268 016 000	169 120 000	62 987 000	70 143 000	60 069 000	176 310 000	426 027 000	645 939 000

Source: Mineral Policy Sector, Energy, Mines and Resources Canada and Natural Resources and Economic Development, Indian Affairs and Northern Development.
(P) Preliminary figures, (R) Revised figures, (E) Estimated

Table 8:
Mineral Production – Northwest Territories
1979–1988

Mineral		1979	1980	1981	1982	1983	1984	1985	1986	1987(R)	1988(P)
Gold	$	61 868 488	96 920 000	85 495 000	91 415 000	144 570 000	191 071 000	177 079 000	205 266 000	223 456 000	197 906 000
	kg	5 356	4 209	4 825	6 113	8 634	12 732	12 713	12 503	11 740	11 422
Silver	$	34 770 651	41 331 000	13 456 000	16 073 000	33 743 000	20 361 000	9 083 000	5 478 000	4 006 000	6 785 000
	kg	83 358	53 000	33 000	51 000	74 000	59 000	33 000	22 000	13 000	27 000
Copper	$	941 732	679 000	613 000	419 000	214 000	130 000	46 000	1 000	4 000	
	kg	397 191	262 000	277 000	215 000	102 000	69 000	23 000	1 000	2 000	
Lead	$	80 117 935	55 853 000	44 680 000	46 367 000	47 901 000	66 647 000	44 489 000	91 129 000	139 370 000	67 227 000
	kg	60 645 969	51 337 000	45 522 000	63 955 000	81 161 000	90 198 000	77 083 000	133 836 000	131 744 000	67 227 000
Zinc	$	205 600 051	172 556 000	159 764 000	229 110 000	269 951 000	368 813 000	356 415 000	322 064 000	328 781 000	477 630 000
	kg	213 323 454	175 685 000	133 604 000	213 523 000	234 883 000	274 920 000	284 223 000	265 073 000	258 070 000	290 000 000
Cadmium	$					10 000	1 034 000	866 000	670 000	501 000	4 124 000
	kg					3 000	214 000	238 000	175 000	86 000	219 000
Bismuth	$					163 000	34 000	60 000		?	
	kg					32 000	3 000	3 000		?	
Antimony	$									141 000	
	kg									44 000	
Tungsten Trioxide (E)	$	52 924 000	67 646 000	43 363 000	36 353 000	11 221 000	33 584 000	38 918 000	17 363 000		
	kg	3 254 067	4 007 000	2 515 000	2 925 000	1 126 000	3 112 000	3 529 000	2 470 000		
Arsenious Trioxide (E)	$			561 000	3 862 000	2 345 000	5 837 000	1 969 000	254 000	666 000	2 168 000
	t			1 094	1 780	982	4 684	4 098	406	?	?
Sulphur (smelter gas)	$							11 665 000	21 788 000	6 912 000	596 000
	t						98 000	147 000	59 000	6 000	
Sand and Gravel	$				41 482 000	32 479 000	36 323 000	8 981 000	3 281 000	8 132 000	7 900 000
	t				6 625 000	5 905 000	7 249 000	6 803 000	986 000	2 183 000	2 125 000
Stone	$				1 268 000	14 601 000	4 617 000	434 000	1 011 000	1 486 000	1 625 000
	t				323 000	2 409 000	729 000	163 000	368 000	472 000	500 000
TOTAL	$	436 222 857	434 985 000	347 841 000	468 349 000	557 198 000	746 451 000	649 732 000	668 452 000	713 310 000	765 961 000

Source: Mineral Policy Sector, Energy, Mines and Resources Canada and Natural Resources and Economic Development, Indian Affairs and Northern Development.
(P) Preliminary figures, (R) Revised figures, (E) Estimated